VOLUME LVIII

NUMBER THREE

THE NATIONAL GEOGRAPHIC MAGAZINE

SEPTEMBER, 1930

CONTENTS

1885

TWENTY-FOUR PAGES OF ILLUSTRATIONS IN FULL COLOR

Jugoslavia—Ten Years After
With 45 Illustrations — MELVILLE CHATER

Rustic Life in Jugoslavia
25 Natural-Color Photographs — HANS HILDENBRAND and WILHELM TOBIEN

The Unexplored Philippines from the Air
With 39 Illustrations — GEORGE W. GODDARD

The Color Camera's First Aërial Success
With 9 Natural-Color Photographs — MELVILLE BELL GROSVENOR

The Great Barrier Reef and Its Isles
With 39 Illustrations — CHARLES BARRETT

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

$3.50 A YEAR

50c THE COPY

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDINGS

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON, D. C.

GILBERT GROSVENOR, President
JOHN OLIVER LA GORCE, Vice-President
O. P. AUSTIN, Secretary
GEO. W. HUTCHISON, Associate Secretary
JOHN JOY EDSON, Treasurer
HERBERT A. POOLE, Assistant Treasurer
FREDERICK V. COVILLE, Chairman Committee on Research

EXECUTIVE STAFF OF THE NATIONAL GEOGRAPHIC MAGAZINE

GILBERT GROSVENOR, EDITOR

JOHN OLIVER LA GORCE, Associate Editor

WILLIAM J. SHOWALTER
Assistant Editor

J. R. HILDEBRAND
Chief of School Service

RALPH A. GRAVES
Assistant Editor

ALBERT H. BUMSTEAD
Chief of Cartographic Division

FRANKLIN L. FISHER
Chief of Illustrations Division

MELVILLE BELL GROSVENOR
Asst. Chief Illustrations Division

BOARD OF TRUSTEES

JOHN JOY EDSON
Chairman of the Board, Washington Loan & Trust Company

DAVID FAIRCHILD
Special Agricultural Explorer, U. S. Department of Agriculture

C. HART MERRIAM
Member National Academy of Sciences

O. P. AUSTIN
Statistician

GEORGE R. PUTNAM
Commissioner U. S. Bureau of Lighthouses

THEODORE W. NOYES
Editor of The Evening Star

GEORGE K. BURGESS
Director U. S. Bureau of Standards

RAYMOND S. PATTON
Director U. S. Coast and Geodetic Survey

CHARLES EVANS HUGHES
Chief Justice of the United States

JOHN J. PERSHING
General of the Armies of the United States

C. M. CHESTER
Rear Admiral U. S. Navy, Formerly Supt. U. S. Naval Observatory

J. HOWARD GORE
Prof. Emeritus Mathematics, The George Washington University

FREDERICK V. COVILLE
Botanist, U. S. Department of Agriculture

GEORGE SHIRAS, 3D
Formerly Member U. S. Congress, Faunal Naturalist and Wild-Game Photographer

JOHN OLIVER LA GORCE
Associate Editor National Geographic Magazine

ROBERT V. FLEMING
President Riggs National Bank

CALVIN COOLIDGE
Formerly President of the United States

CHARLES G. DAWES
American Ambassador to Great Britain

JOHN BARTON PAYNE
Chairman American Red Cross

A. W. GREELY
Arctic Explorer, Major General U. S. Army

GILBERT GROSVENOR
Editor of National Geographic Magazine

GEORGE OTIS SMITH
Director U. S. Geological Survey

O. H. TITTMANN
Formerly Superintendent U. S. Coast and Geodetic Survey

JOHN FOOTE, M. D.
Dean and Professor of Pediatrics, Georgetown University

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

TO carry out the purposes for which it was founded forty-two years ago the National Geographic Society publishes this Magazine monthly. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed $55,000 to Admiral Byrd's Antarctic Expedition.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society's notable expeditions to New Mexico have pushed back the historic horizons of the Southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region The Society's researches have solved secrets that have puzzled historians for three hundred years. The Society is sponsoring an ornithological survey of Venezuela.

TO further the study of solar radiation in relation to long range weather forecastings, The Society has appropriated $65,000 to enable the Smithsonian Institution to establish a station for six years on Mt. Brukkaros, in South West Africa.

Copyright, 1930, by National Geographic Society, Washington, D. C., in the United States and Great Britain. All rights reserved. Entered at the Post Office at Washington, D. C., as Second-Class Mail Matter. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917, authorized July 1, 1918.
Cover design and names registered in United States Patent Office. Marca Registrada.

WHO

arrives first at the directors' meeting?

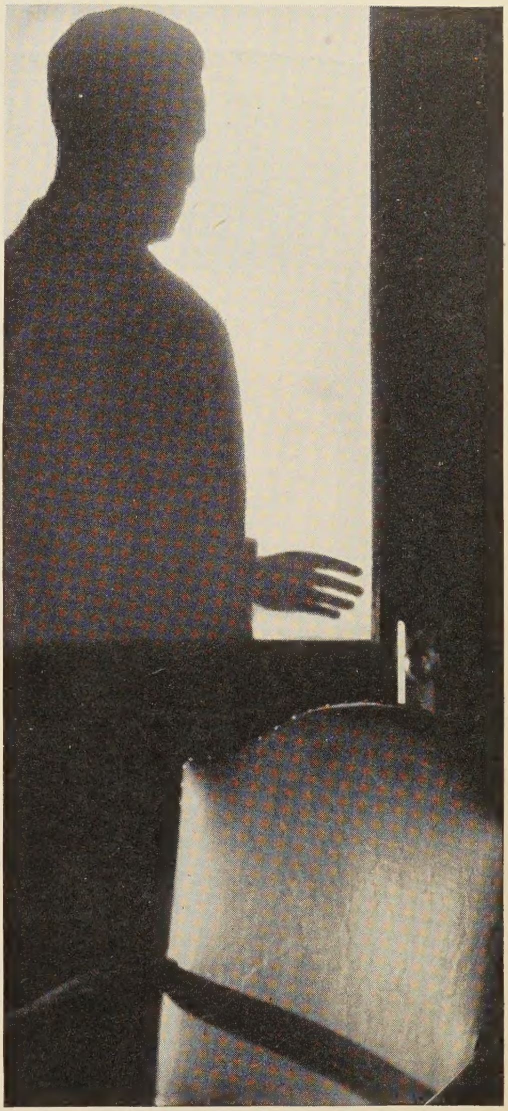
THE first to arrive is the one man privileged to waste others' time. But he seldom does. The president is generally in his chair on the very stroke of the hour.

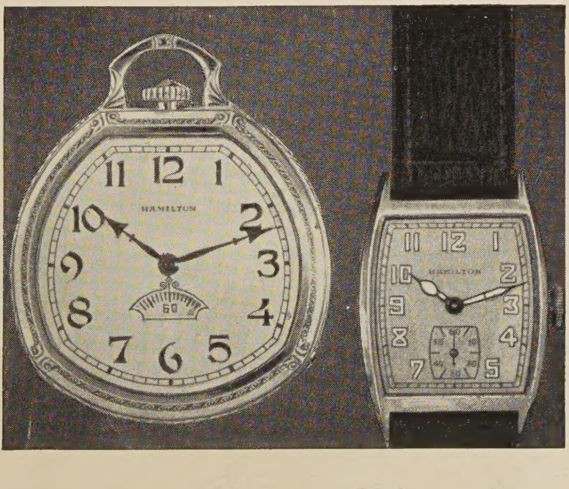
Perhaps he is president because he has learned and never forgotten that time means money . . . that wasted minutes, slipshod habits and a poor mind too often live together.

Successful men fight for their minutes as intelligently as they fight for their business. Their clamor to save time is answered by ships that chop a day from the transatlantic voyage . . . by the air-mail that claws hours from inter-city correspondence . . . by extra-fare trains that rescue part of a business day from a journey.

They want a watch that is as eager for accuracy as they are. That's why you are more than likely to find Hamiltons ticking in their pockets or around their wrists. The unerring accuracy of a Hamilton appeals to the man whose mind is keyed to the modern tempo.

May we send a free copy of "The Timekeeper"? Address Hamilton Watch Co., American manufacturers of high-grade watches, 882 Columbia Avenue, Lancaster, Pa.





Left—The VAN BUREN—With secometer dial, in 14k filled green or white gold, $60. The GLENN CURTISS—A new 19-jewel model in 14k yellow or white gold, $150. *Other Hamiltons for men and women from $48 to $685*

HAMILTON

The Watch *of* Railroad Accuracy

HAMBURG-AMERICAN
LINE

CRUISES

Around the World

on the RESOLUTE
"QUEEN OF CRUISING STEAMSHIPS"

A lifetime's experience in 140 days! A vast and vivid panorama of the world's scenic wonders—a gorgeous pageant of different peoples, contrasting customs—on "The Voyage of Your Dreams." 33 strange lands—Egypt and the Holy Land—Somaliland and a Tour Across India—Indo-China and Siam—Angkor Wat and the Island of Bali—Ceylon, Java and Borneo—China, Japan and Hawaii. Drink in their mysterious beauty—gather their exquisite silks, carvings and curios. And all the time you are enjoying the luxury and cool comfort of the "Queen of Cruising Steamships."

Rates, $2000 and up, include an extraordinary program of shore excursions to innumerable points of scenic and historic interest.

EASTWARD
FROM NEW YORK
JANUARY 6, 1931
Visiting each country at the ideal season

Mediterranean and Adriatic

On the luxurious
S. S. HAMBURG

Here is *The* Mediterranean Cruise de Luxe for 1931. Never has there been any to equal it! *Every country bordering the Mediterranean and Adriatic will be visited.* The cruise follows the seasons—outward along the Coast of Africa; homeward along the European Coast. 70 days (New York to New York). The price, including a great program of shore excursions, is $950 up, with return passage from Hamburg, Cherbourg or Southampton by any ship of the Line up to December 31, 1931. Also short cruises in the Mediterranean by S. S. Oceana, from European ports.

FROM
NEW YORK
JAN. 31, 1931

West Indies

Another season of those far-famed "Pleasure Pirate Pilgrimages," from New York: Special Christmas Cruises on the ever-popular S. S. RELIANCE and RESOLUTE, 16 days, $200 and up; four other Winter cruises on the famous RELIANCE, 16 to 27 days, $200 and $300 and up.

Write for descriptive literature of the cruise in which you are interested.

HAMBURG-AMERICAN
LINE

39 BROADWAY NEW YORK

Branches in Boston, Chicago, Cleveland, Philadelphia, St. Louis, San Francisco, Los Angeles, Seattle, Montreal, Toronto, Winnipeg, Regina, Edmonton, Vancouver, or local steamship agents.

For complete information write The Bryant Heater & Mfg. Co., 17869 St. Clair Avenue, Cleveland, Ohio.

Do you *like* to breathe soot and grime? Do ashes or greasy vapors *help* you in your housekeeping? Is furnace-room dirt *necessary* to your happiness?

Silly questions, aren't they?

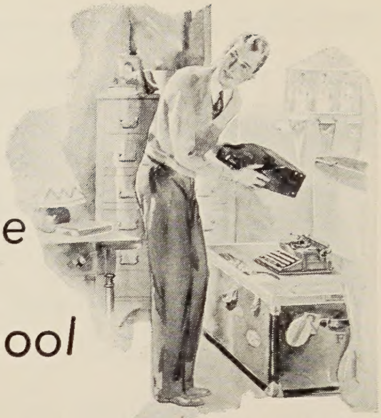
It is because your answers are "No . . No . . NO!" that you and your household would so thoroughly appreciate Bryant Automatic Heating which

brings no dirt
into the house
creates none

BRYANT
GAS
HEATING

-lets your Pup be your Furnace Man

© BHMC



With John entering College
. . . And Mary in High School

A QUESTION AROSE

CERTAINLY John would need a Royal Portable at College, even more than in his Senior year at high school. He well knew the advantages and convenience of typing themes and class notes.

But—when he started to pack the family's Royal Portable Typewriter, Mary appealed to her mother. She, too, had used it daily with increasing reliance upon its helpfulness. Must she be handicapped by tedious handwriting; must father and mother again pen their letters?

Obviously, two Royal Portables were needed. For the importance of this handy, home typewriter is everywhere recognized—both as an aid to high school and college success, and as a truly indispensable writing accessory for the home.

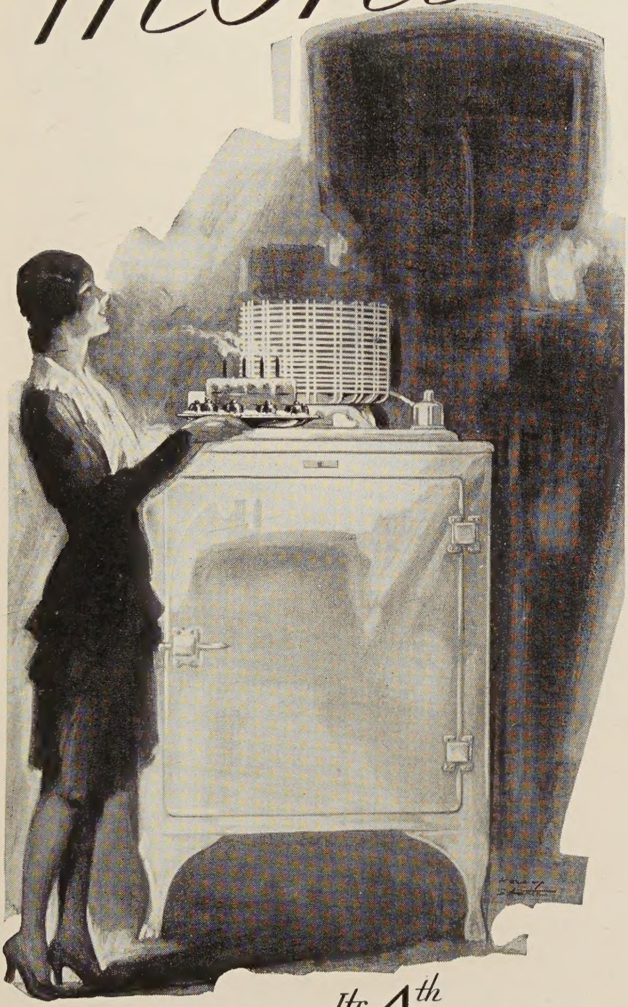
Visit your nearest dealer today. Once you have seen how simple a Royal Portable is to operate you will never be without one.

Superior in design and construction — sturdier, quieter and more beautiful, the Royal Portable is the finest of home-sized typewriters. Available in a wide variety of Duotone colorings; equipped if you wish with "Vogue," Royal's new type-face created for personal correspondence. The price is only $60 with standard 4-bank keyboard and carrying case. Convenient monthly payments if desired.

ROYAL TYPEWRITER COMPANY, INC., NEW YORK CITY
More than 2000 Royal Portable Dealers in United States

Royal Portable
TYPEWRITERS

The refrigerator with the *monitor top*



Its 4th BIRTHDAY
—and this remarkable refrigerator adds still another year to its record of service.

The Monitor Top, which contains the hermetically *sealed-in-steel* mechanism, is the modern symbol of economical refrigeration. Its splendid performance record merits the name—MONITOR TOP.

WHEN you buy your electric refrigerator, look for the Monitor Top *first of all.* It is your assurance of efficiency, your guarantee of economy and convenience.

Within the hermetically sealed walls of the Monitor Top the simple General Electric mechanism moves quietly in a *permanent* bath of oil. Air, dirt and moisture are sealed out.

The dependable mechanism of the Monitor Top makes the General Electric Refrigerator a servant that lightens labor, saves money and above all guards the health of the family.

Prices now start at $205.00 at the factory. You can have a gleaming white General Electric Refrigerator—striking in modern beauty—placed in your kitchen tomorrow by taking advantage of our time payment plan.

For booklet, write Section R-9, Electric Refrigeration Dept., General Electric Company, Hanna Bldg., 1400 Euclid Ave., Cleveland, Ohio.

GENERAL ELECTRIC

ALL-STEEL REFRIGERATOR

ELECTRIC WATER COOLERS • COMMERCIAL REFRIGERATORS • ELECTRIC MILK COOLERS

Join us in the General Electric Program, broadcast every Saturday evening on a nation-wide N. B. C. network.

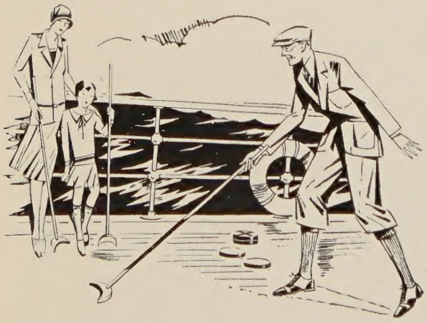
WATCH YOUR HUSBAND

Is the Price of Success beginning to tell?

The path to achievement is lined with the headstones of men who *couldn't stop work.* Earnest, unselfish martyrs to the modern fetish of material success.

In the hall of achievement are seated the men whose wives *made them rest;* who were quick to detect the signs of incipient breakdown, who demanded a surcease from the relentless, health-destroying grind of modern business.

Wives must do this, for their husbands' welfare—and their own. A winter cruise via **Red Star** or **White Star** lines is ideal for rest, relaxation; for paving the way to new interest, new zest, new romance in life. The following cruises are packed with health and recreation—and the price of these all-important rest periods is surprisingly moderate. Let us send you the booklet, "Watch Your Husband." It may be worth thousands of dollars to you and your loved ones.



Around the World—Life's grandest travel adventure! *Red Star* liner **Belgenland,** most famous world cruising ship. Sails westward from New York, December 15. Duration, 133 days. Over a six-times-tried and proved itinerary. $1750 (up) including shore excursion.

Mediterranean—Great *White Star* liner *Britannic* (new) and *Adriatic.* 46 days, calling at the principal points of tourist interest. Sailings: January 8 and 17, February 26, March 7. Rates: $695-$750 (up) 1st Class; $420 TOURIST Third Cabin—both including shore excursions.

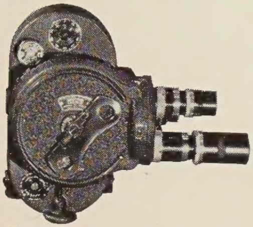
Address your inquiry for descriptive literature and for the booklet "Watch Your Husband" to Desk A, I. M. M. Company, No. 1 Broadway, New York City.

WHITE STAR LINE—RED STAR LINE

INTERNATIONAL MERCANTILE MARINE COMPANY

30 Principal Offices in the United States and Canada. Authorized agents everywhere.

Retain the spell of old FRANCE . .



●

Filmo 70-DA with critical focuser, $270 and up in Sesamee-locked Mayfair case. Other Filmos from $120 up. Filmo Projectors, $198 and up.

●

All Filmos use 50 or 100 foot films

For black and white pictures, Filmo cameras use Eastman Safety Film (16 mm.) in the yellow box — both regular and panchromatic — obtainable at practically all dealers' handling cameras and supplies. Filmo cameras and Filmo projectors are adaptable, under license from Eastman Kodak Company, for use of Kodacolor film for home movies in color. Cost of film covers developing and return postpaid, within country where processed.

. . . in FILMO movies

Homecoming fishermen in Brittany, fountains playing at Versailles, peasants in the fields below Mont St. Michel . . . the spell of old France is quickly cast. And what traveller would not have it last forever?

There is one way to remember always the precious scenes of your travels, to have them with you to live over and over again at will. Take theater clear movies of them—in colors if you like—with Filmo, the better personal movie camera. For only in the great precision and scientific design of Filmo can you be assured of the photographic excellence which retains your travels with the same detail which so thrilled you in the original.

Filmo personal movie cameras and projectors are products of Bell & Howell, makers for more than 23 years of the professional studio cameras used by the major film producers of the world. Ask a nearby Filmo dealer to demonstrate Filmo personal movie cameras and projectors, or write today for illustrated booklet, "What You See, You Get."

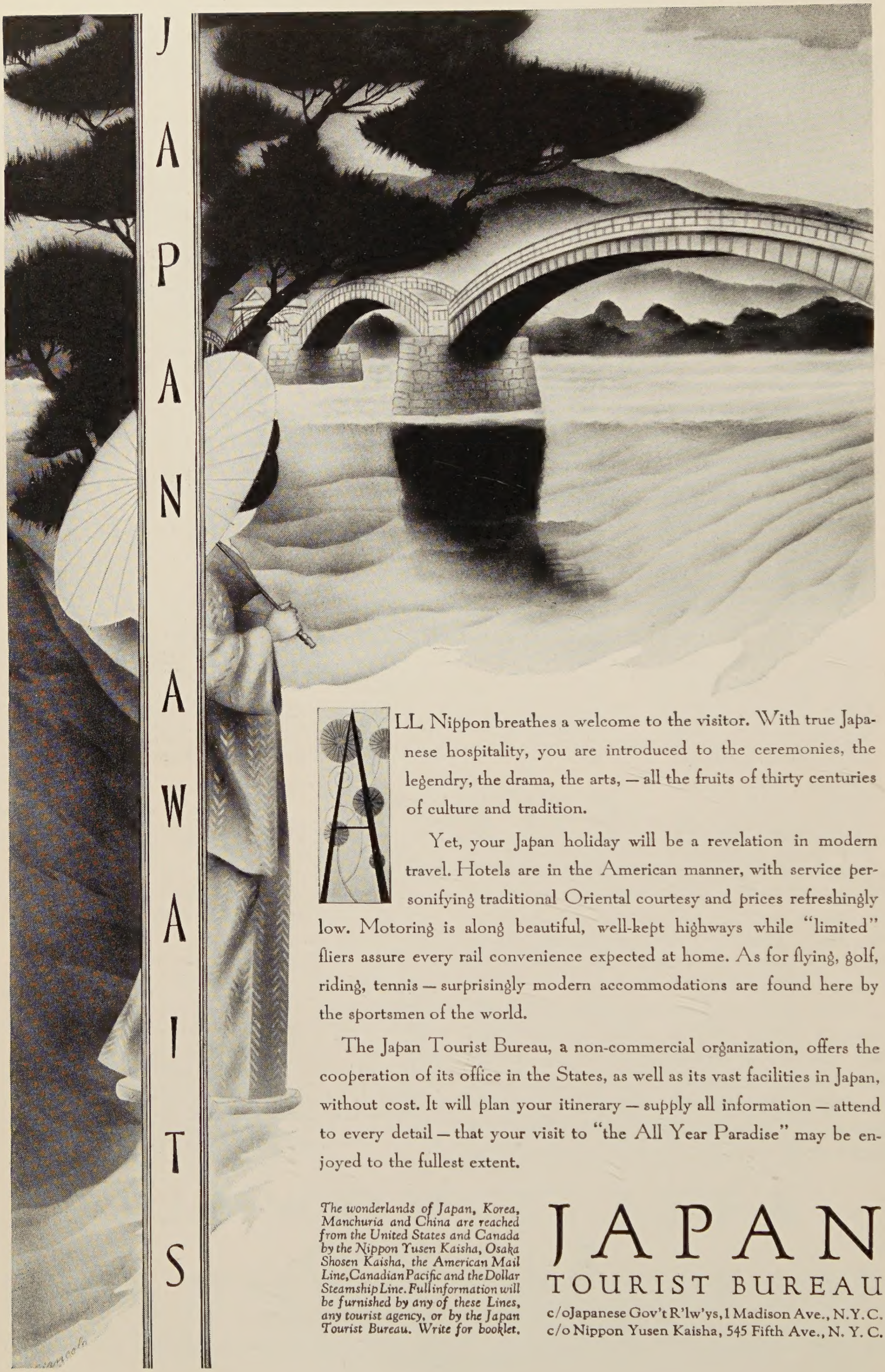
BELL & HOWELL
FILMO
AUTHORIZED DEALER

Look for this Filmo sign—displayed by better dealers everywhere

BELL & HOWELL
FILMO

Professional Results with Amateur Ease

Bell & Howell Co., Dept. U, 1804 Larchmont Ave., Chicago. New York, Hollywood, London (B & H Co., Ltd.)
Established 1907



ALL Nippon breathes a welcome to the visitor. With true Japanese hospitality, you are introduced to the ceremonies, the legendry, the drama, the arts, — all the fruits of thirty centuries of culture and tradition.

Yet, your Japan holiday will be a revelation in modern travel. Hotels are in the American manner, with service personifying traditional Oriental courtesy and prices refreshingly low. Motoring is along beautiful, well-kept highways while "limited" fliers assure every rail convenience expected at home. As for flying, golf, riding, tennis — surprisingly modern accommodations are found here by the sportsmen of the world.

The Japan Tourist Bureau, a non-commercial organization, offers the cooperation of its office in the States, as well as its vast facilities in Japan, without cost. It will plan your itinerary — supply all information — attend to every detail — that your visit to "the All Year Paradise" may be enjoyed to the fullest extent.

The wonderlands of Japan, Korea, Manchuria and China are reached from the United States and Canada by the Nippon Yusen Kaisha, Osaka Shosen Kaisha, the American Mail Line, Canadian Pacific and the Dollar Steamship Line. Full information will be furnished by any of these Lines, any tourist agency, or by the Japan Tourist Bureau. Write for booklet.

JAPAN
TOURIST BUREAU
c/o Japanese Gov't R'lw'ys, 1 Madison Ave., N.Y.C.
c/o Nippon Yusen Kaisha, 545 Fifth Ave., N. Y. C.

No. 2 OF SERIES

THIS series of advertisements is designed to acquaint business men with Grinnell Company as it really is. Automatic Sprinkler protection for which it first won international fame and leadership is not the chief business of the Company. Its equally high reputation for many other industrial piping specialties and commodities has been built on super-standards of manufacture and on original conceptions which are well known to engineers and architects. Business men, too, need to know the real quality in these products.

THERMOLIER FOR INSTANCE

THERMOLIER, a Grinnell development in unit heaters, is the best and cheapest device for heating industrial and commercial buildings.

It delivers both a saving in the *cost* of heat and a surprising satisfaction in results. This new degree of satisfaction, with none of the failings and vagaries of cast iron radiation, establishes Thermolier as the *modern* installation. Into it is built 50 years of heating experience.

Ten thousand of these units have already been installed, and are daily winning preference by performance.

One small unit only two feet wide by two feet high gives more satisfactory heat than ten times its weight in pipe coils or cast iron radiation. Temperature is automatically controlled; supervision of heat becomes a thing of the past. Units are up out of the way blowing heat down.

Let our engineers help you solve your heating problem. Write today for further information and the booklet illustrating Thermolier's 14 points of definite superiority. Address Grinnell Company, Inc., 250 West Exchange St., Providence, R. I.

The ORGANIZING HAND
prepares for your needs

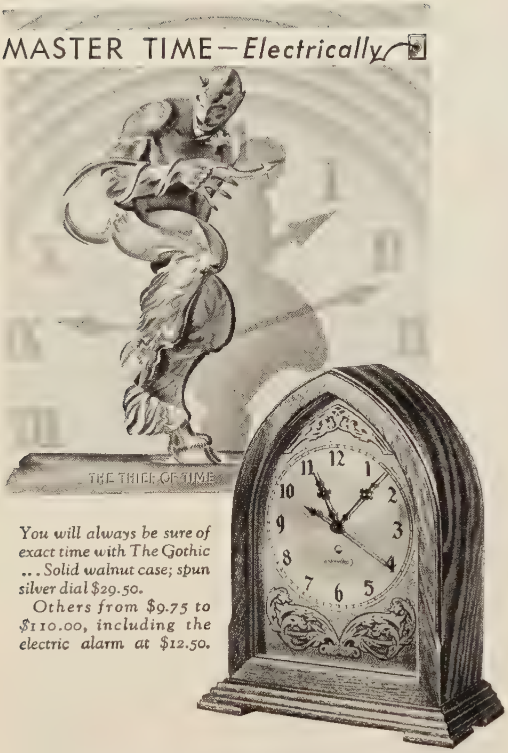
HEATING ENGINEER
HUMIDIFYING ENGINEER
CONSTRUCTION SUPT
METALLURGIST
FOUNDRY MANAGER
MECHANICAL ENGINEER
ELECTRICAL ENGINEER
PLANT MANAGER
POWER ENGINEER
SPRINKLER ENGINEER
FOUNDED 1850

- **Thermolier** the copper unit heater. A better and cheaper means of heating many types of industrial and commercial buildings.
- **Thermoflex Radiator Traps** with the famous Hydron bellows, insuring perfect operation of your steam radiators.
- **Pipe Fabrication.** Pipe bends, welded headers and the Triple XXX line for super power work.
- **Pipe Fittings** perfectly threaded, accurately machined and rigidly inspected.
- **Pipe Hangers** featuring easy adjustability after the piping is up.
- **Humidification Equipment.** Complete systems employing the unique automatic control, Amco.
- **Automatic Sprinkler Systems** with the famous Quartz bulb head. The world's largest sprinkler manufacturer and contractor.

GRINNELL COMPANY

Branches in all Principal Cities

Executive Offices: Providence, R. I.



You will always be sure of exact time with The Gothic ... Solid walnut case; spun silver dial $29.50.

Others from $9.75 to $110.00, including the electric alarm at $12.50.

Only All-Electric Time Is Certain

YOU are never deceived by the all-electric clock. The hands of the Hammond always point to exact time. You can be positive of that.

It's a wonderfully comfortable feeling to know that your clock will never fail you—to know that it is recording the passage of time with the accuracy that only electricity can deliver. Winding and regulating become a thing of the past when your clock is a Hammond.

Beautiful models especially designed to give every room all-electric time are now being shown by electrical, jewelry and department stores. The coupon will bring you an illustrated folder *Electric Time without Clock Springs*.

The Hammond Clock Company N-1
2915 N. Western Ave., Chicago, Ill.
Please send me free illustrated folder "Electric Time Without Clock Springs."

Name____________________
Address____________________
City__________ State__________

HAMMOND
ALL-ELECTRIC CLOCKS

The Helpful Hand *for* Voyageurs Abroad

It is when you step ashore from the steamer's gangplank in a foreign port that the Helpful Hand of the American Express begins its important duty of making travel easier and simpler. Travelers always consult it about passport intricacies, hotels, railroads, steamships, and knotty travel problems.

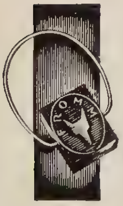
It is a guarantee of carefree travel service and an automatic introduction is YOURS the moment you purchase American Express Travelers Cheques. Recognized and accepted for almost two generations, they have earned a popularity second only to America's own dollar bill. Issued in denominations of $10, $20, $50, and $100. Cost 75c for each $100. Sold by 22,000 Banks and the offices of American Express and Railway Express Agency.

for safety and spendability
AMERICAN EXPRESS
Travelers cheques

Steamship tickets, hotel reservations, itineraries, cruises and tours planned and booked to any part of the world by the American Express Travel Department

Alfred Cheney Johnston
N.Y.

FROMM pedigreed SILVER FOX . . . *fuller* . . . *finer* . . . MORE SILVERY!



BE SURE MEDALLION IS INTACT ON THE SCARF YOU BUY. YOU REMOVE IT... AND RETURN IT TO FROMM BROS., FOR PEDIGREE CERTIFICATE DESCRIBING THE SCARF YOU HAVE PURCHASED.

The sure way to identify a Fromm Pedigreed Silver Fox is by the medallion . . . But, even without the medallion, a superior fullness and silkiness of fur and an especial abundance of silver distinguishes each of these masterpieces as a perfect example of scientific, twenty-one year straight-line breeding . . . Your dealer will show you his share of the 4000 available pelts . . . A free booklet will be sent you on request.

FROMM BROS., HAMBURG, WIS.

Rolscreens
TRADE MARK

The finest window screens « « « « you can buy

The joy of home life is increased since the modern, built-in window screens, Rolscreens require no storing.

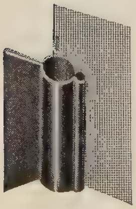
They roll up at a touch, unseen and completely protected. Convenient—yes—and think of the big saving in labor and expense each season.

The mechanical exactness, special exclusive features and the beautiful (double life) electro-plated "AluminA" wire make Rolscreens the outstanding window screens of the age. No, not high priced, just a wise investment—that is—when you specify the trade marked Rolscreens TRADE MARK

Replacing your window screens—building or remodeling—you will want to look over the

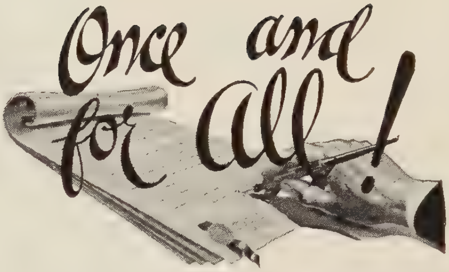
Illustrated Rolscreen Booklet mailed upon request.

ROLSCREEN COMPANY
422 Main Street **Pella, Iowa**



Fifteen Patented Features of Rolscreens are essential to practical rolling window screens.

A SECTION through guide showing lug in selvedge of screen wire which prevents sagging. A "non-sagging" feature found only in Rolscreens.
FULLY GUARANTEED


Once and for All!

WRITING and figures in Higgins' Eternal Ink *are down once and for all*, from the very moment your pen touches the paper!

Time will never affect the permanently clear writing of this superb ink! Chemicals will not eradicate it, sunlight or moisture will not fade it, heat will not blister it. Black and beautiful, it's down for good!

It costs you no more to impart the same Eternal distinction and protection to your business and personal writing as thousands of discriminating individuals everywhere. Try it today!

CHAS. M. HIGGINS & CO., Inc., 271 Ninth St., B'klyn, N.Y.
Makers of Higgins' American Drawing Inks and Adhesives for Half a Century

At all Dealers 10¢

HIGGINS' ETERNAL
BLACK WRITING INK

HIGGINS' Eternal black writing Ink

JET BLACK–NEVER FADES–PROOF AGAINST CHEMICALS

For Steel Pens & Fountain Pens

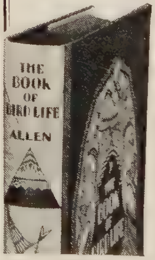
BIRD LOVERS! Here's the Book You've Always Wanted

A *new* kind of bird book that not only helps you to recognize the birds but explains their *habits* in detail and enables you to understand the many puzzling things they do. Here at last is a comprehensive guide to an intimate knowledge of all phases of bird life—

The BOOK *of* BIRD LIFE

by Arthur A. Allen, Ph.D.
Professor of Ornithology, Cornell

This splendid, illustrated handbook reveals in detail the amazing truths of the lives and habits of the birds; their wonderful instincts; their growth, training, courtship, home life, feeding, songs, plumage, etc.—and all this not in bare facts alone but with explanations that enable you to understand the reason for each detail and to interpret its meaning. Also explanations of the evolution, classification, and distribution of bird life and a fascinating section of methods of bird study.



275 Unusual Photographs

including many rare action photographs by the author. 20 big chapters deal with birds of woods, orchards, fields, marshes, shores, and birds as pets. A thrilling book for entertainment and nature study. Judge for yourself. You may see it at your bookseller's, or

Get It for FREE Examination
Mail This Coupon

D. Van Nostrand Co.,
250 Fourth Avenue,
New York, N. Y.

Please send me a copy of *The Book of Bird Life* for examination. Within ten days I will either return the book or remit $3.50, payment in full. (N. G. M. 9-30)

Name ____________________

Address ____________________

City ____________________ State ____________________

If you prefer, send remittance with order. Full refund if book is returned in ten days.

Empress OF Japan

NEWEST GIANTESS OF THE
PACIFIC "MIRACLE"

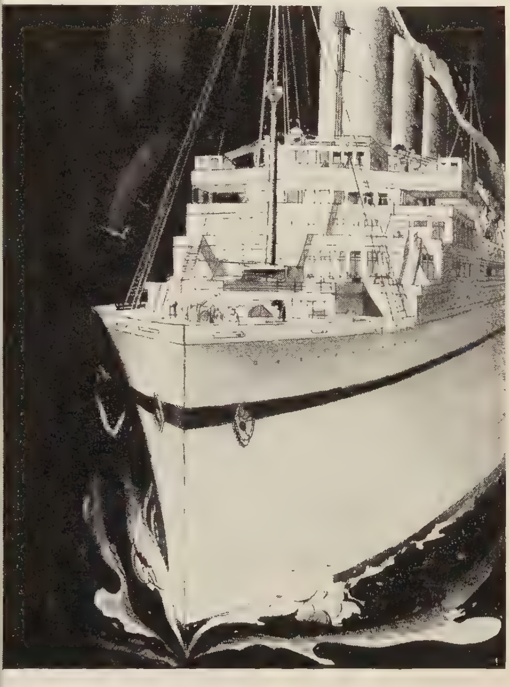
● The mammoth white hull of the new Empress of Japan looms on the Pacific horizon! On Sept. 4, she makes her first dash from Vancouver to Hawaii and the Far East...26,000 gross tons, 39,000 tons displacement, 21 knots speed...largest, fastest ship on the Pacific.

Her luxurious appointments surpass even those of her famous sisters, Empresses of Canada, Russia and Asia. Her swimming pool tiled in green and black marble, her suites-with-bath opening on private verandahs, her telephones, lifts, teakwood floors, sports deck, period lounges, these are but a few of the highlights in her appearance and facilities. The Empresses offer proportionately fine second class.

FAR EAST INTO NEAR WEST ●

These great white Empresses are performing the Pacific "miracle." They turn Far East into Near West. Take them either via Hawaii, the paradise route, or straight across to Yokohama from Vancouver and Victoria.

Ask for folder showing complete Empress sailings, ships' plans, and illustrated color booklets on the fascinating Orient itself. Information, reservations, and freight inquiries from your own agent or any Canadian Pacific office: New York, Boston, Philadelphia, Washington, Chicago, Montreal, and 29 other cities in the United States and Canada.



She brings the Orient 2 days nearer

A Far Eastern rite
... the buying of offerings at Temple gates

TO THE

Canadian ORIENT Pacific

WORLD'S GREATEST TRAVEL SYSTEM

WHEN WINTER COMES!

EGYPT and the MEDITERRANEAN . . . Aboard that famous liner . . . the Mauretania . . . to Europe's glorious Inland Sea . . . the annual classic Mediterranean Cruise . . . to Madeira, Gibraltar, Tangier, Algiers, Villefranche, Nice, Naples, the ineffable beauty of Capri and Amalfi. Cairo, Heliopolis . . . Lands where summer greets you in March. The Mauretania sails from New York February 21 . . . returns via Southampton. Rates: New York to Madeira, Gibraltar, Tangier, Algiers, Villefranche and Naples $275 up. New York to Athens, Haifa and Alexandria, $350 up.

WEST INDIES . . . To the West Indies on a Cunarder means much more than merely a "West Indies Cruise!" . . . superb luxury . . . suave transatlantic service . . . famous ships perfectly attuned to tropical voyaging . . . treat yourself to a valuable mid-winter "tuning-up" . . . slip, aboard one of these magnificent ships, into heart-warming sunshine . . . to Havana . . . Kingston, Nassau, Panama, San Juan, Santo Domingo, Santiago, Bermuda, Haiti! Beginning with the Thanksgiving Day cruise of the Franconia sailing on November 18, Cunard offers nine notable cruises varying in duration from 8 to 18 days . . . with sailings until March 31. Rates from $110 up.

Send for descriptive literature to your local agent or 25 Broadway, New York

CUNARD

JAMES BORING'S CRUISES

Round-the-World, Dec. 3

The distinctive advantages of a James Boring's Cruise are now available on a cruise around the world—unfailing, personal service from a staff of American cruise specialists—a ship particularly built for cruising—comprehensive itinerary—very moderate rates. The luxurious Cunarder S. S. *Samaria* sails from New York Dec. 3 and from San Francisco Dec. 21 westward to places of greatest interest and lure. Rates, $1,600 up, cover all necessary expenses, including shore trips.

MEDITERRANEAN

Jan. 8, 17; Feb. 26; Mar. 7

Four cruises to this famous sea to suit everyone's purse and convenience. 46-day itineraries include Madeira, Gibraltar, Algeria, France, Italy, Greece, Turkey, Holy Land, Egypt, Sicily, Monaco. New White Star Line Motorship *Britannic* sails Jan. 8 and Feb. 26; splendid White Star Line S. S. *Adriatic* sails Jan. 17 and March 7. Inclusive rates: first class, $695 up; tourist third cabin, $535.

WEST INDIES, Jan. 24 to Feb. 11

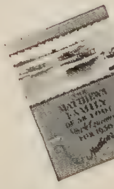
The club-like Cunard cruise ship *Caledonia* sails Jan. 24 on James Boring's *Seventh* West Indies Cruise. Visits Bermuda, Haiti, Jamaica, Panama, Havana, and Nassau.

Inquire of local agent or Dept. W39

JAMES BORING'S
TRAVEL SERVICE, INC.
730 Fifth Avenue New York, N.Y.

Matthews Cruisers *are* STAUNCH ENOUGH *to* *Laugh at Any Weather*

HAVE you ever wanted a hobby that combined relaxation, contentment, pleasure, health, sociability and comfort? That could be shared by every member of your family and your friends as well? Have you ever longed for a release from the routine of your business? Have you ever wanted to make a pal of your boy? Then turn to this glorious, carefree life that is yours aboard a handsome, husky Matthews "38" or "46." These boats are inexpensive to own and maintain. They offer cruising and sleeping accommodations for four, six or eight. Cook your own meals, cruise to new fishing grounds, explore new country, settle down to the unexcelled luxuries that await you afloat. We'll gladly send you all the information you wish. Write for it today.



Send me the booklets on Matthews "38" and "46" foot cruisers.

THE MATTHEWS COMPANY
Designers and Builders of Boats of Distinction . . . Since 1890
300 Bay Side Port Clinton, Ohio

New North Coast Limiteds

Indeed a Veritable Moving Palace

Dining cars, as well as the most modern of Pullmans, have been created for the New North Coast Limiteds, for the enjoyment of travelers between Chicago and the Northern Pacific Coast.

NORTHERN PACIFIC
YELLOWSTONE PARK LINE

For Western Travel Information address
E. E. Nelson, 290 N. P. Bldg., St. Paul, Minn.

RAYMOND-WHITCOMB
MEDITERRANEAN CRUISE

Spend Mardi Gras at Nice

see the giddy Carnival . . . it is the climax of the Riviera's winter season

The Raymond-Whitcomb Cruise will be there then . . . seats are already engaged for its parades of floats and its battles of confetti.

THIS visit to Nice at Mardi Gras is typical of the entire Raymond-Whitcomb Cruise. It is not a mere string of ports. It is the whole Mediterranean . . . from Gibraltar to Jerusalem . . . at its best . . . with unusual attractions in the program, the sight-seeing, and its calls at out-of-the-way places. Send for the booklet describing it. To sail January 31 on the S.S. "Carinthia." Rates, $1000 and up.

RAYMOND-WHITCOMB
ROUND THE WORLD CRUISE

To sail January 21 on the S.S. "Columbus" the largest, most luxurious, and fastest liner ever to make a world cruise.

Because the cruise ship is faster, there will be less time at sea . . . the cruise will take only 107 days. Yet the program is complete in its calls, sight-seeing, and shore excursions —*Egypt, India, Ceylon, Straits Settlements, Java, Philippines, Siam, Hong Kong, Peking, Japan,* (at Cherry Blossom time). Special optional side trips to Angkor and to beautiful and little-known Bali. This is the ideal Round the World Cruise. Rates, $2000 and upward.

Send for the illustrated booklet

West Indies Cruises
Land Cruises to Mexico and California

RAYMOND-WHITCOMB

126 Newbury Street, Boston, Massachusetts

New York, 670 Fifth Avenue; *New York,* 225 Fifth Ave.
Boston, 165 Tremont St.; *Philadelphia,* 1601 Walnut St.
Chicago, 176 N. Michigan Ave.; *Detroit,* 421 Book Bldg.
Los Angeles, 423 W. Fifth St.; *San Francisco,* 230 Post St.
Agents in the principal cities

So much to see!

CARL ZEISS
BINOCULARS

Depend on your Carl Zeiss Binocular to give you a strikingly clear "close-up" of the many interesting sights on your trip, and of every thrilling moment at the races, polo matches, regattas, and other sporting events.

See the various models—at leading dealers. Write for catalogue.

Carl Zeiss, Inc., 485 Fifth Avenue, New York
728 South Hill Street, Los Angeles

CARL ZEISS JENA

SOUTH AMERICA

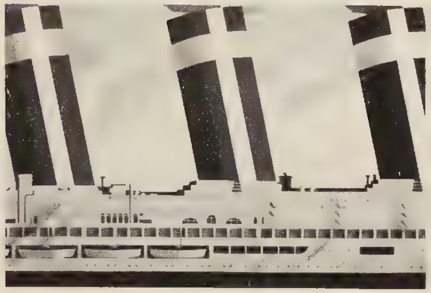
Gayest of journeys stopping at the most fascinating of ports — Bermuda, Rio de Janeiro, Santos, Montevideo, Buenos Aires, on magnificent Munson Liners, fastest and steadiest ships, faultless service.

BERMUDA Forever delightful, the voyage from New York on the comfortable, steady S. S. Pan America (21,000 tons) weekly. Also regular fortnightly service on great South American Liners. 40 hours service—round trip $70 and up.

For information see local tourist agent or

MUNSON Steamship Lines
67 Wall Street, New York City

AUTUMN ABROAD?
SAIL ON AN AMERICAN LINER!



If a delicious morning cup of coffee is a positive must . . . a daily newspaper a prime essential . . . a sparkling shoe polish a requisite of personal service . . . plus conversation with your gracious steward in your own tongue . . . then book your passage on one of the ships of the famous transatlantic fleet of the United States Lines. Possibly little things, these; but indicative of the broad, intimate character of American service. For five day speed, take the LEVIATHAN, World's Largest Ship . . . brilliant Club Leviathan . . . a marvelous Ben Bernie dance orchestra . . . first run "Talkies" . . . Brokerage offices with continuous quotations . . . only ship with three distinct ship-to-shore services, including telephone . . . magnificent cuisine with a la carte without extra charge. Or those fine, inexpensive cabin liners—GEORGE WASHINGTON, AMERICA, REPUBLIC, PRESIDENT HARDING and PRESIDENT ROOSEVELT.

UNITED STATES LINES

American Merchant Liners direct to London every Thursday, $100.

For complete information see your local agent or our offices: New York, 45 Broadway; Atlanta, 714 Healy Building; Boston, 75 State St.; Chicago, 216 N. Michigan Avenue; Cleveland, Hotel Cleveland Building; Detroit, 1514 Washington Boulevard; St. Louis, Jefferson Hotel; Philadelphia, 1600 Walnut Street; San Francisco, 691 Market Street; Los Angeles, 756 South Broadway; Minneapolis, 312 Second Avenue, South; Seattle, 1337 Fourth Avenue; Pittsburgh, 705 Liberty Avenue; Washington, 1027 Connecticut Avenue; Little Rock, Wallace Building; New Orleans, Hibernia Bank Building. Berlin, Unter den Linden 9; Hamburg, Cor. Alsterthor & Ferdinandstrasse; London, 14 Regent Street, S. W. 1.; Paris, 10 Rue Auber. THESE LINES OFFER A COMPLETE FREIGHT SERVICE — SPECIFY AMERICAN SHIPS FOR YOUR FOREIGN TRADE.

Rock Island

The De Luxe

GOLDEN STATE LIMITED

DIRECT TO

CALIFORNIA

BEST AND SHORTEST WAY

Chicago to El Paso, Tucson, Chandler, Phoenix, Agua Caliente, Indio and Palm Springs

Through Arizona's enchanted lands. Historically-rich Apache Trail, cliff dwellings, crumbling temples. Moonlit nights of mystery. The comfort of modern hotels. The pleasure of outdoor sports.

AMERICA'S FINEST TRAIN

Every Travel Luxury—No Extra Fare

Most Convenient Schedule
Only 2 Days Chicago to California
3 Days from Coast to Coast
Other fast trains
Thru sleepers from St. Louis and Minneapolis

ROCK ISLAND

THE ROAD OF UNUSUAL SERVICE

For detailed information mail this coupon

Rock Island Vacation Travel Service Bureau 913
707 La Salle Street Station, Chicago, Ill.

Please send me literature descriptive of Arizona and California and full information regarding train schedules and service via Golden State Route.

Name______________________________

Address______________________________

A new kind of bran food

YOU can't taste the bran in this Pettijohn's. There's not a single sharp edge to irritate nervous digestions. Yet the bran of this luscious hot golden-wheat cereal is more delicious than cold dry bran. That's because every bran flake is softened by cooking, and concealed in tender flavory flakes of whole wheat. Thousands who try Pettijohn's say they never knew bran could be so gentle, so effective, so utterly delicious. Pettijohn's takes but 3 to 5 minutes to cook. It is made by The Quaker Oats Company, manufacturers of 49 different cereal products with mills in 12 cities throughout the United States and Canada. Try Pettijohn's tomorrow morning.

Are you interested in new menus for children? In new recipes for whole-wheat cookies and desserts? Send for a new Free booklet, "The Truth About Bran." Address 7-9, The Quaker Oats Company, Chicago

Pettijohn's

THE NEW
PETTIJOHNS
Quaker Oats Company

SOUTH AMERICA

DIRECT TO RIO—12 DAYS

No Intermediate Stops

The FOUR PRINCES

FORTNIGHTLY service on the famous "Prince" ships provide for the *fastest time* to Rio de Janeiro, Santos and Montevideo with 17-day service to Buenos Aires.

Accommodations for first-class passengers only. Reservations and literature at authorized tourist agents' or Furness Prince Line, 34 Whitehall St. (where Broadway begins), or 565 5th Ave., N. Y. C.

'ROUND WORLD TOURS
108 Days
23 Ports
$680

Prince Line Service has been continuous between New York and South America for 35 years

FURNESS *Prince* LINE

The most practical toilet kit

for Traveling

No loops . . . no gadgets . . . no monkey-business!

At exclusive shops or order direct

$ 6.00 size 8⅝ x 3⅞ x 1⅞
7.50 size 9½ x 4½ x 2¼
10.00 size 10½ x 5⅜ x 2¾

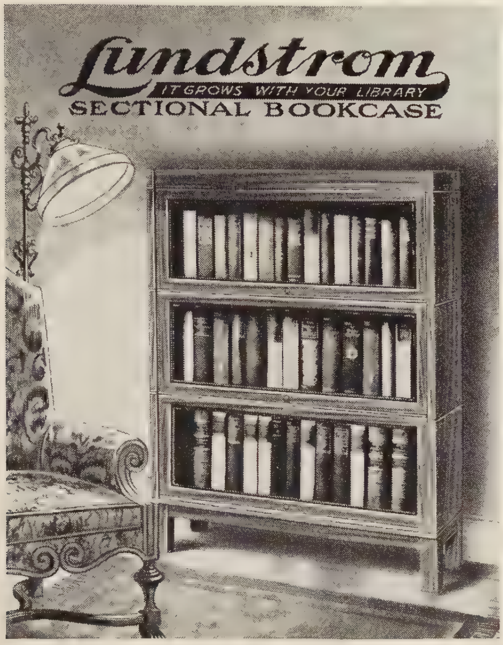
Name or initials embossed on lid, 25c extra. ©1930 H & CO

Quickly packed. Plenty of room. Everything is together—ready for instant use. Handmade of superlative quality solid leather. Natural russet color. Three convenient sizes. A great gift! At exclusive shops, or by mail postpaid from Hamley & Company, Saddlemakers since 1883, 413 Court St., Pendleton, Oregon.

HAMLEY KIT

MADE LIKE A FINE COWBOY SADDLE OF GENUINE SOLID LEATHER

The IDEAL Bookcase For the Modern Library



$3.75 and up per Book Section with Glass Door ON APPROVAL—Direct to User

Used in over 200,000 of the finest homes and offices throughout the country. Furnished in a number of designs, in different materials and finishes, giving almost any desired effect. Sold direct from factory only, which assures you a permanent source of supply for additional sections in the future, and also saves you the middleman's profit. Price of the case illustrated above, in Universal Design, consisting of top, base and three book sections with **non-binding, disappearing, felt-cushioned** glass doors, in plain oak, **$17.00;** in quartered oak or imitation mahogany or walnut, **$19.00;** in genuine mahogany or walnut, **$26.00.** Other styles, grades and finishes at correspondingly low prices. **Shipped on approval direct from factory** at a big saving to you. Write for Catalog No. 80.

The C. J. LUNDSTROM MFG. CO., Little Falls, N. Y.

Manufacturers of Sectional Bookcases since 1899
New York Showroom, 130 West 42nd St.

Home-Study
Business Training

Your opportunity will never be bigger than your preparation. Prepare now and reap the rewards of early success. **Free 64-Page Books Tell How.** Write NOW for book you want, or mail coupon with your name, present position and address in margin **today.**

☐ Higher Accountancy
☐ Mod. Salesmanship
☐ Traffic Management
☐ Rail. Station Mgmt.
☐ Law: Degree of LL.B.
☐ Commercial Law
☐ Industrial Mgmt.
☐ Banking and Finance
☐ Telegraphy
☐ Business Mgmt.
☐ Railway Accounting
☐ Business Corres.
☐ Credit and Collection Correspondence
☐ Modern Foremanship
☐ Personnel Mgmt.
☐ Expert Bookkeeping
☐ C. P. A. Coaching
☐ Business English
☐ Commercial Spanish
☐ Effective Speaking
☐ Stenotypy—Stenogy.
☐ Paper Salesman's Training

La Salle Extension University, Dept. 9397-R, Chicago

MEDITERRANEAN CRUISE SUPREME

Al-yaum ahsan min bukrah!

Moslem wisdom—"Today is better than tomorrow!" ... Decide *today* to join the Homeric next January ... Sail on the largest steamer cruising ... a perfect panorama of the Great Inland Sea ... a glorious opportunity to bask in historic lands at their most delightful season ... the dreamy Balearic Islands ... Majorca ... venerable olive orchards sunning on terraced hills ... Palma's historic palaces rubbing elbows with modern hotels ... Soller, gay with orange and lemon gardens ... quaint carnivals a-beat to the zombomba's deep notes ... and be sure to eat of delectable *coca de sobreasada!*

The Eighth Homeric Cruise—the Cruise Supreme to the Mediterranean—sails from New York January 24—to Madeira ... Casablanca ... Spain ... Algeria ... Balearic Islands ... Italy ... Tunisia ... Malta ... Greece ... Turkey ... the Holy Land ... a long stay in Egypt ... Sicily ... Corsica ... The Riviera at its social peak.

Illustrated Guide-book and full information on request

THOS. COOK & SON
585 Fifth Avenue, New York
Philadelphia Boston Baltimore Washington Chicago St. Louis
San Francisco Los Angeles Toronto Montreal Vancouver
in co-operation with
WAGONS-LITS CO.

HOMERIC

Do You Make these Mistakes in ENGLISH?

Sherwin Cody

MANY persons say "Did you hear from him today?" They should say "Have you heard from him today?" Some spell calendar "calender" or "calander." Still others say "between you and I" instead of "between you and me." It is astonishing how often "who" is used for "whom," and how frequently the simplest words are mispronounced. Few know whether to spell certain words with one or two "c's" or "m's" or "r's" or with "ie" or "ei." Most persons use only common words—colorless, flat, ordinary. Their speech and their letters are lifeless, monotonous, humdrum.

Wonderful New Invention

For many years Mr. Cody studied the problem of creating instinctive habits of using good English. After countless experiments he finally invented a simple method by which you can acquire a better command of the English language in only 15 minutes a day.

Under old methods rules are memorized, but correct habits are not formed. Finally the rules themselves are forgotten. The new Sherwin Cody method provides for the formation of correct habits by calling to your attention constantly only the *mistakes you make*—and then showing you the right way without asking you to memorize any rules.

One of the wonderful things about Mr. Cody's course is the speed with which these habit-forming practice drills can be carried out. You can write the answers to fifty questions in 15 minutes and correct your work in 5 minutes more. The drudgery and work of copying have been ended by Mr. Cody! You concentrate always on your own mistakes until it becomes "second nature" to speak and write correctly.

FREE—Booklet on English

A new booklet explaining Mr. Cody's remarkable method is ready. If you are ever embarrassed by mistakes in grammar, spelling, punctuation, pronunciation, or if you can not instantly command the exact words with which to express your ideas, this new free booklet, "How You Can Master Good English—in 15 Minutes a Day," will prove a revelation to you. Send the coupon or a letter or postal card for it now. SHERWIN CODY SCHOOL OF ENGLISH, 389 Searle Building, Rochester, N. Y.

SHERWIN CODY SCHOOL OF ENGLISH
389 Searle Building, Rochester, N. Y.

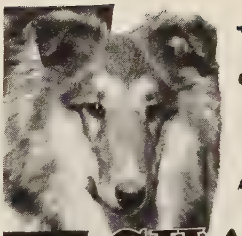
Please send me your free booklet, "How You Can Master Good English—in 15 Minutes a Day."

Name ....

Address ....

....

This valuable booklet can not be sent to children.



yourDog *needs* CHARCOAL!

To be in perfect condition, with clear eyes, a springy step, and a glossy coat, your dog must be properly fed.

KEN-L-RATION contains all the food elements so necessary to the dog. Pure charcoal is indispensable, and just the correct amount of this valuable ingredient is contained in every can of Ken-L-Ration.

Pure meat, cereals, cod-liver oil and charcoal make Ken-L-Ration the perfect dog food. Do not accept substitutes.

Send For FREE Sample

CHAPPEL BROS., Inc.
89 PEOPLES AVE.
ROCKFORD, ILL.
Ken-L-Ration is sold in more than 50,000 stores. Ask for it by name.

KEN-L-RATION
THE DOG FOOD SUPREME

4 REASONS WHY *you should buy bonds* TODAY!

1. Good bonds are *safe . . . today* and *tomorrow*.
2. Good bonds cost *less today* than they probably will *tomorrow*.
3. Good bonds bring a *regular income*.
4. And today S. W. Straus & Co. is offering good bonds to yield as high as 6¼%.

You can't afford to miss today's opportunity. Mail the coupon . . . now . . . for our free illustrated booklet, "How to Invest Money."

Specify Booklet N-109

S. W. STRAUS & CO.

ESTABLISHED 1882 *INCORPORATED*
INVESTMENT SECURITIES
565 Fifth Ave., N. Y. C. *PLAza 4200*

Gentlemen: Please send me, without obligation, a copy of "How to Invest Money," Booklet N-109. I am considering investing..........

Name..

Address.......................... City..........................

WHY FAMOUS MEN OF THE DAY USE BARBASOL

Barbasol is the Headliner Shave

Barbasol
Barbasol an antiseptic beard softener for Shaving
No brush No lather No rub-in
Barbasol Antiseptic Beard Softener

✻ Barbasol testimonials are not paid for.

Jesse Crawford, musician extraordinary; wizard of the motion-picture pipe organ; creator of musical novelties and "effects." He's a featured artist at the great Paramount Theater on Broadway these days, where he is charming thousands daily.

. . . a quick, clean act . . . with a "wow" finish

**"We're all showmen—behind the lights or on the stage of life—and that's why the Barbasol shave is best for the boys who have to take the spotlight, whether in big business or in the show business. Barbasol's a real trouper—no fuss; no trouble; no brush, no rub, or lather. And how quick and clean the razor gets through its routine. And, man, what a fine finish! I give it a big hand."*

Jesse Crawford

IT'S the comfort, speed, ease and almost magical beard-softening of the Barbasol shave that turns so many men into Barbasol Believers.

Follow these directions and you'll be following the crowd—

1 Wet your face thoroughly. Leave it wet.
2 Spread on Barbasol. Don't rub it in.
3 Wet a good blade and—Shave.

If you're going to be a Barbasol Believer, don't look for a lather. No brush needed; and, man, how clean and crisp the razor glides along. How refreshed and soft and COMFORTABLE your face feels afterward. Blades last longer, too. Get Barbasol from the drug store today, generous tubes 35¢ and 65¢.

Barbasol
Skin Freshener
eau vegetale

BARBASOL
SKIN FRESHENER

Here's a new kind of "bracer." Slap it on face or neck, morning, noon or night, for a quick pick-up. It t-i-n-g-l-e-s; rejuvenates.

THE BARBASOL COMPANY, Indianapolis, Indiana

Barbasol

For Modern Shaving

No brushing — No lathering — No rubbing

Why 86% of you say "O. K."

GENTLEMEN: No product wins first place without good cause. So when we tell you that Palmolive Shaving Cream is the fastest selling shaving cream in the world—it is only another way of describing its superiority.

Our 68-year-old laboratories asked 1000 men to dictate the effects a shaving cream should have. Time and again formulas failed to do what we demanded. Then the 130th formula brought success.

A shaving cream, made on the principles of an olive oil soap, overcame the prime objections men had to old-fashioned methods.

Won't *you* at least give us the opportunity of convincing you? Please mail the coupon.

PALMOLIVE RADIO HOUR—Broadcast every Wednesday night—over WEAF and 39 stations associated with The National Broadcasting Company. 5965

PALMOLIVE
35
Shaving Cream

7 SHAVES FREE

and a can of Palmolive After Shaving Talc

Simply insert your name and address and mail to Palmolive, Dept. M-851, P. O. Box 375, Grand Central Post Office, New York City.

....

....

....

(Please print your name and address)

CHARACTER WORTHY OF THE IDEALS THAT PROMPTED ITS SELECTION

IN ONLY one quarry, boring deep into the heart of the rugged Vermont Hills is found Rock of Ages . . . the even-textured, blue-gray granite that defies the ravaging touch of time.

DURING the millions of years required for its formation, this fine granite assumed the close-grained hardness and changeless beauty that have made it the preferred monumental material adaptable to many distinctive finishes. Long after less enduring things shall have crumbled, a memorial of Rock of Ages will remain whole and unblemished, a symbol truly worthy of the everlasting memory it enshrines.

THE ROCK OF AGES certificate which your local memorial craftsman will give you, is an unqualified guarantee, both of material and of craftsmanship.

●

Write for our interesting and helpful booklet
"HOW TO CHOOSE A MEMORIAL"

ROCK OF AGES

THE *DISTINCTIVE* BARRE GRANITE

ROCK OF AGES CORPORATION . . . BARRE, VERMONT

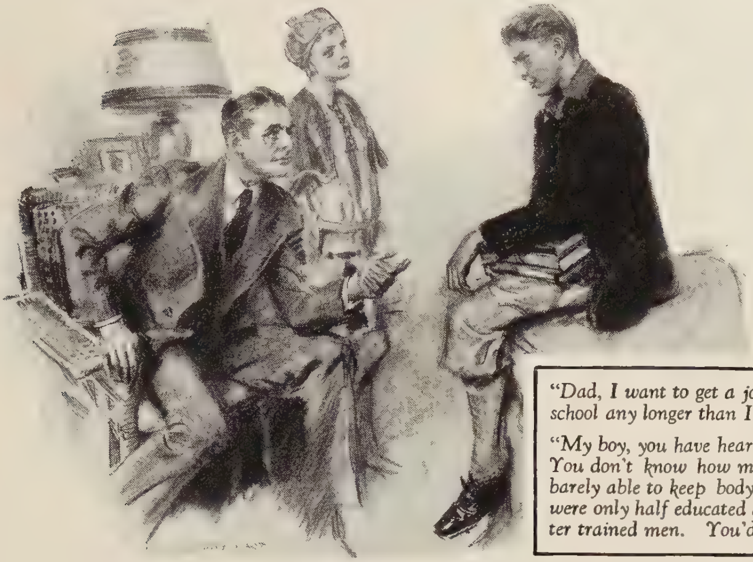
Without obligation, please send me your FREE booklet "How To Choose A Memorial."

*Name*________________________________

*Address*______________________________ D-9

Schooling Raises Pay

Statistics show that, on the average, high school graduates earn $1.00 for every 72 cents earned by boys with merely elementary education.



"Dad, I want to get a job. Lots of rich men didn't go to school any longer than I have."

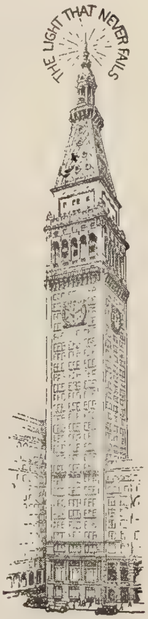
"My boy, you have heard about only the rare exceptions. You don't know how many millions of men have been barely able to keep body and soul together because they were only half educated and unable to compete with better trained men. You'd better go back to school."

©1930 M. L. I. Co.

MAYBE it is the boy next door—perhaps it is your own boy—who is eager, restless and ambitious, who would like to quit school and go to work. He is looking forward to the day when he will have more spending money and more independence.

He has read of self-made men who had but little schooling. He sees no reason why he could not do equally well.

Tell him that if he had a chance to talk to one of the big, self-made men of whom he has heard, he would probably be told, "While I was earning a place for myself in the business world I studied at night trying to keep up mentally with my old school friends—even those who went through college."


THE LIGHT THAT NEVER FAILS

Before he is permitted to leave school it would be a great thing if he could talk to some man or woman in charge of employment for a big company. He would learn that the better educated boys and girls are given preference, from the outset, over those who quit school too soon.

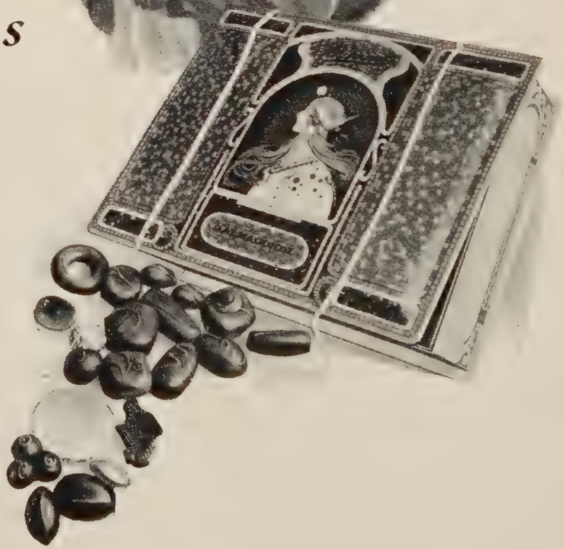
In almost every kind of work, whether manual, mechanical, business or professional, higher wages and salaries, in the overwhelming majority of cases, are earned by the best educated and best trained.

Apart from the greater enjoyment of books, arts and science gained through education—and just as a matter of cold dollars and cents—education pays the best dividends.

METROPOLITAN LIFE INSURANCE COMPANY

FREDERICK H. ECKER, PRESIDENT

ONE MADISON AVE., NEW YORK, N. Y.



Sea-going chocolates

A favorite package of Whitman's for all forms of sports is the SALMAGUNDI.

Put up in metal boxes holding one pound or two pounds.

Out of doors they combine quick energy and quiet enjoyment in your search for "where the blue begins." Chosen as companion by experienced travelers by land, water or air.

Salmagundi and other Whitman specialties are sold by selected stores all over the country, and at every resort.

Any telegraph office will take your order and cash for any Whitman package; purchase the package at any distant point and deliver by uniformed messenger.

Whitman's Chocolates

© S. F. W. & Son, Inc.

VOL. LVIII, No. 3 WASHINGTON SEPTEMBER, 1930

THE NATIONAL GEOGRAPHIC MAGAZINE

COPYRIGHT, 1930, BY NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON, D. C., IN THE UNITED STATES AND GREAT BRITAIN

JUGOSLAVIA—TEN YEARS AFTER

BY MELVILLE CHATER

AUTHOR OF "THE SHORES OF SUNRISE," "MICHIGAN, MISTRESS OF THE LAKES," "THE DANUBE, HIGHWAY OF RACES," ETC., ETC., IN THE NATIONAL GEOGRAPHIC MAGAZINE

A QUARTET of us lingered over our breakfast coffee on an Italianate square at Dubrovnik (Ragusa), regarding the Adriatic's sweep of pastel blue and comparing Armistice memories of ten years before.

We reënvisaged a rush of weeks that were enlivened by hysterical parades, champagne nights, looming revolutions, wholesale kissing, and rumors of old States dissolving, of new States being born. Soon map-makers at the "peace show" were wrestling with the pronunciation of such place names as Przemyśl or stealthily inquiring of their secretaries if Schmöllnitzhütte were mountains or a river.

And so it was small shame that a far-off prospective tourist, upon first hearing of Jugoslavia, had remarked, "Slavia sounds as if it's in Russia, but where is Jugo?" And it was not until the battle dust of the peace conference had subsided and official maps had been published that the uninformed discovered that the Balkan Slavs had constituted themselves as a new State, whose name meant simply "Southern Slavia."

It was a near-by wall placard bearing the official letters "S. H. S." that had served to remind us breakfasters that we were in the Kingdom of Srba, Hrvata, Slovenaca (*i. e.*, Serbs, Croats, and Slovenes) during its decennial year. From Sušak we had coasted along its archipelago-fringed shores—a 680-mile vista of Roman remains, Gothic cathedrals, Italianate campanili seen against the Dinaric Alps' sea-paralleling ridges. And now we were to penetrate their barrier for a glimpse of the less-known interior.

Breakfast over, we sought out Laurence, our chauffeur. Laurence, though untraveled outside of America, was not only a good chauffeur but an excellent cook—something to be considered when motoring through out-of-the-way regions. We found him deep in a language jam with the hotel porter.

Laurence was gesticulating his need of gasoline, the porter was telling him where he could buy *"essence, première qualité,"* and Laurence kept repeating scornfully, "Essence? Man, I don't want no perfumery. What I want is just plain old gas."

And I don't think he believed "essence" could possibly be anything but a drugstore product until he saw the American trademark on the gasoline container.

Dubrovnik sank below us as we zigzagged up the mountains. Seen from their crests, the old walled town appeared like a toy fortress, while the archipelago resembled a blue cloth overscattered with mauve pincushions. Abrupt transition! For ahead of us stretched Hercegovina's Karst region, an unimaginably wild and desolate scene. The seaward flanks of the ridge were clothed in semitropical luxuriance, while on their landward side lay a nude, sterile expanse of rock-heaped, mountain-ringed table-land.

For six hours we traversed that region of the damned. There was scarcely a

Photograph by Melville Chater

THROUGH HILLS OF KARST THE NERETVA HAS CUT A DEEP GORGE

Rivers honeycomb the spongy stone formation in this poorest part of Hercegovina. The barren country offers little for human comfort, and natives of these hills are among the hardiest in Jugoslavia. With a passion for learning, many of them have made brilliant records in the universities.

hut, save for some battered, half-roofless conglomeration of stones. There was scarcely a human face, save for that of some cloaked, sandal-shod goatherd with his skinny flock.

A "POLJE" GLADDENS THE EYE

Now some blanched mountain side revealed an artificially rock-ringed bit of scrub, a pitiable grazing ground, salvaged among the limestone. Occasionally, in a pit among the rocks, appeared an earthy patch about the size of a golf green, plowed for cultivation. It was a "Karst hole," situated over one of the many subterranean streams that pierce this sponge-like, yet stony, region on their way to the sea.

We hadn't spoken for hours, for the Karst had a curiously numbing effect on our spirits, when one of us, like some castaway sighting a sail, pointed to a distant plateau, exclaiming, "Am I dreaming, or is that grass?"

It was. The spot proved to be a *polje,* which means simply "field," although we regarded it more in the light of a heaven-provided oasis. It was a mere ribbon of land, some 16 miles long, dotted with groups of gaily clad peasants who were scything grain. With winter, due to rains and swollen springs, this polje would become a lake sixty feet deep. During the rest of the year it represented the granary of I know not how many villages throughout that sterile region.

For two more hours we wound through the interminable Karst, where bald rocks seemed to grin skull-like over the gloomy scene. At last we skirted a hamlet, then the mountains receded, and we actually beheld trees and heard the trickling waters of a cultivated plain.

GRAVESTONES INTERFERE WITH A SEARCH FOR WATER

Conversation sprang up. Laurence, who had been the gloomiest of the party, produced a tin container and announced that he would get some water for his engine. Five minutes after he had vanished around a bend in the road we beheld him scurrying across lots at a speed quite unusual to him, carrying the empty container.

"It's a buryin' groun'!" he announced in hollow tones.

"Oh, get the water, anyway!" we chorused. But Laurence would not stir. "*Wild* man's buryin' groun'!" he protested sulkily.

Expecting to see the turban-topped headstones of some Moslem cemetery, we cut across the fields. Straddling the road's course across the moor, there appeared a curious community of mortuary monuments. Christian? Moslem? All one could say was that they were certainly ancient. There were square tombs of solid rock shaped like gabled houses. There were lofty stone slabs carved with strange figures—kilted warriors with spear and shield and long-haired patriarchs lifting their arms to heaven—as archaic in appearance as Egyptian tomb carvings.

In puzzled silence we returned to our car.

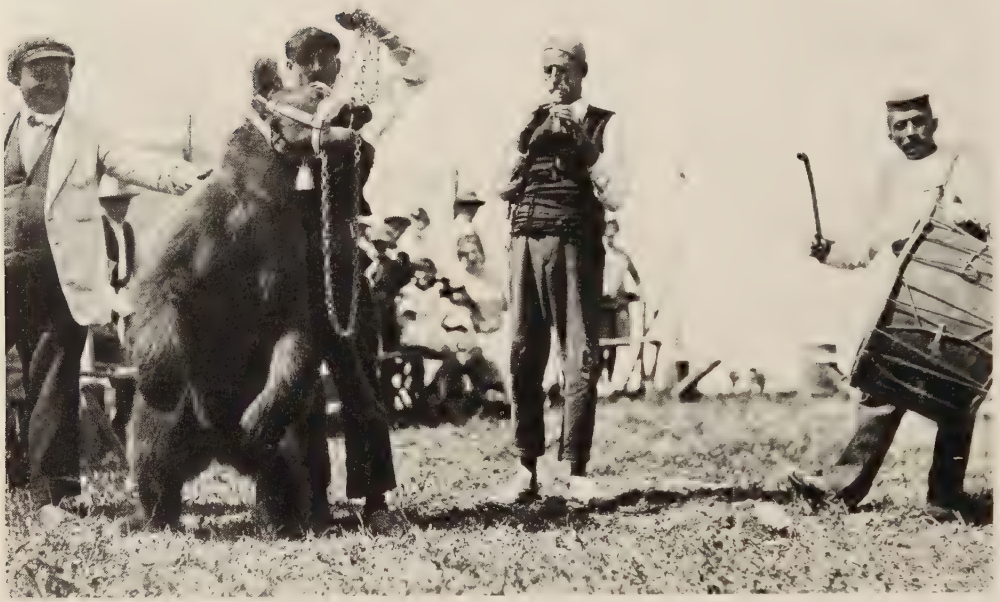
"Huh!" muttered Laurence, as we drove off. "Don't ketch me fillin' ma radiator from no wild man's buryin' groun'!"

A ROD FISHER'S PARADISE

Two hours later, issuing from the Neretva Valley and crossing another polje, we found ourselves in Mostar. All the charm of surprise lay in its spectacle of many minarets agleam over red roofs fringing the swift stream. The Neretva—that strange, Karst-region river, now suddenly in spate, now as suddenly at ebb—has cut the tale of centuries on its steep rock banks. Grotesquely gnarled, they suggest the mad handiwork of some Titan turned carver. Still, as of old, its stone bridge smiles, sunlit, over the angry stream as if secure of faith in its early builders. Still black-hooded, nunlike figures cross and recross it, as Moslem womanhood has done for four centuries, to bazaar booths that display heaped pumpkins, mammoth cabbages, and pink-fleshed fish.

Those fine fish were no less than Neretva salmon trout, as we learned at dinner-time when a splendid specimen, accompanied by a bottle of Mostar's raisin-flavored wine, appeared on our table.

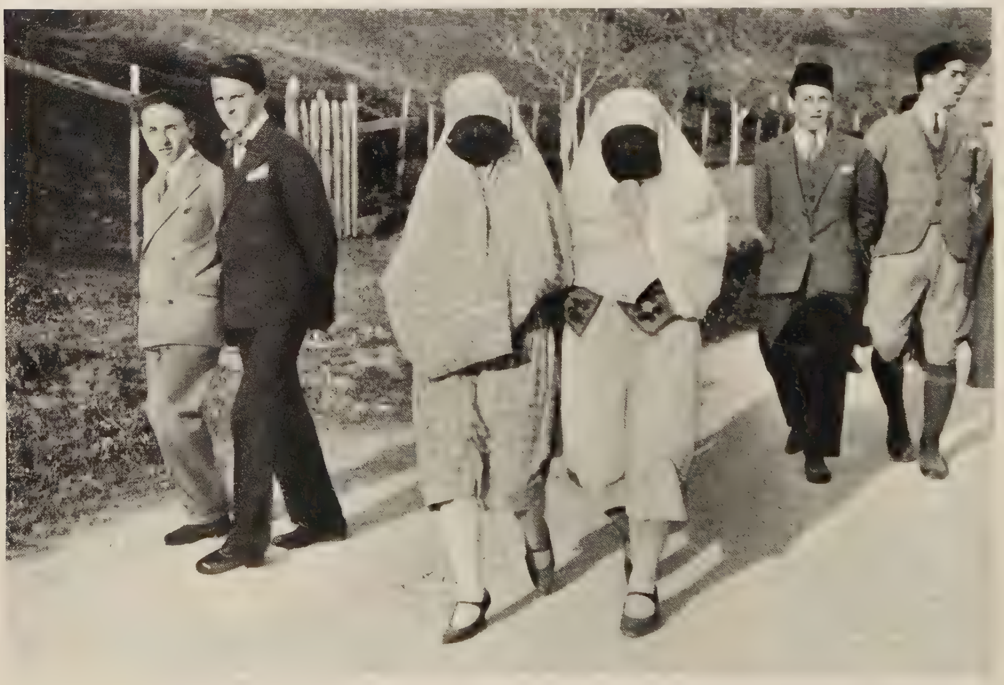
The limestone rivers of Bosnia-Hercegovina constitute a rod fisher's paradise. From the deeper rivers of northern Jugoslavia come gigantic variations of catfish and sturgeon, the latter tipping the scales at 600 pounds and more. As for Jugoslavian trout, the magnificent speckled fellows inhabiting the Government fish



Photograph by Atelje Vlada Benčić

DRUM AND FLAGEOLET SET THE GREAT BEAR DANCING

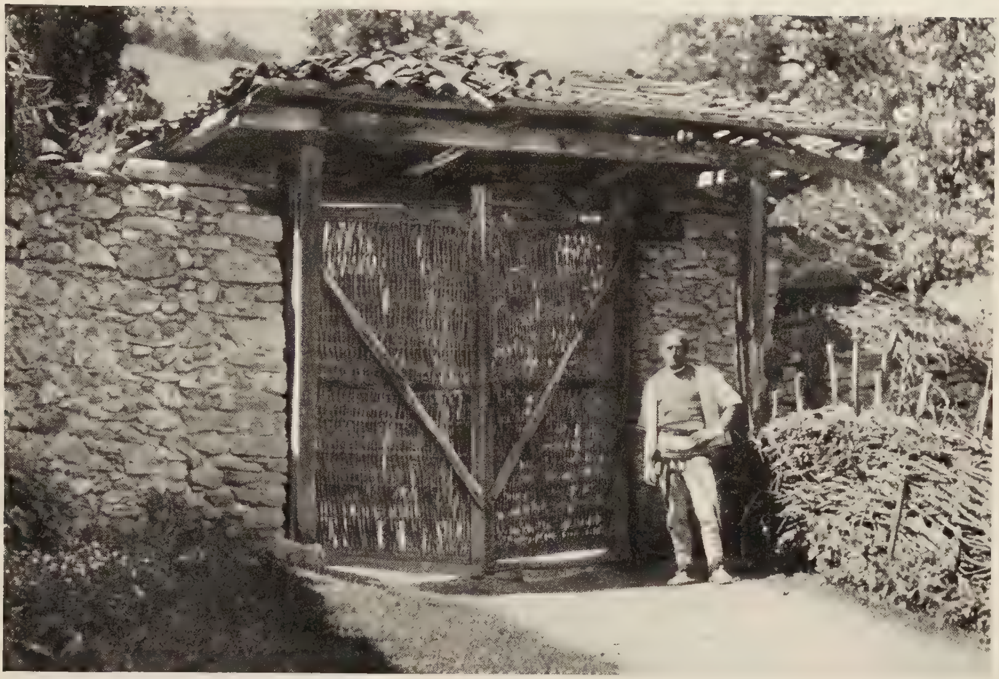
It is always carnival time where southern Serbian gypsies wander. Natural musicians and showmen, they gain a livelihood by entertaining holiday crowds.



Photograph by Alice Schalek

MOSLEM WOMEN ENJOY A SUNDAY PROMENADE

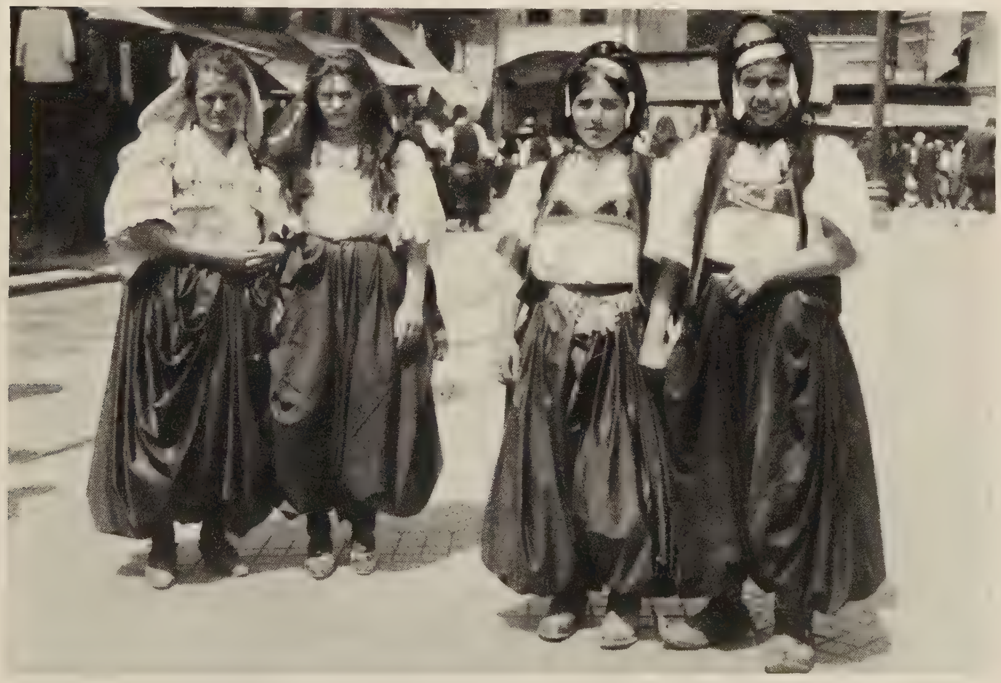
Serbian Mohammedans are descendants of people converted to Islamism by necessity centuries ago (see illustration, page 282), but they adhere more strictly to the forms of their faith than the Turks of Constantinople. Modern custom permits short skirts, but veils are not yet laid aside in public.



Photograph by Mabel Brown Ellis

WOVEN TWIGS MAKE A STRONG GATE FOR A SERBIAN VILLAGE

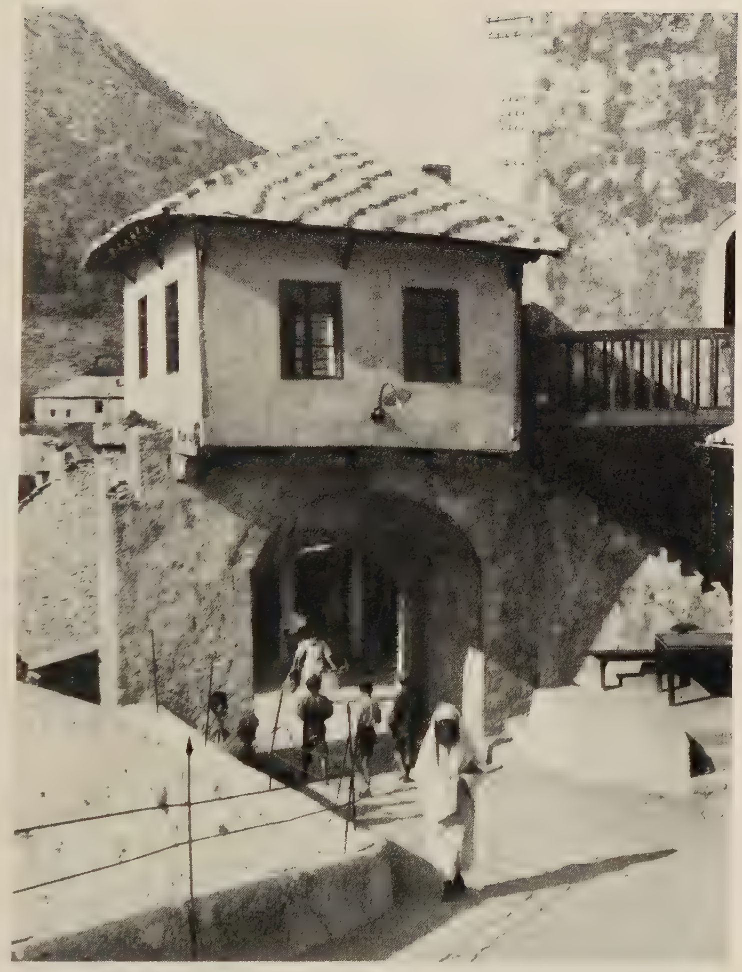
Doors of the same sort are used in the peasant houses. They serve admirably in summer, but afford scanty protection from winter drafts.



Photograph by Alice Schalek

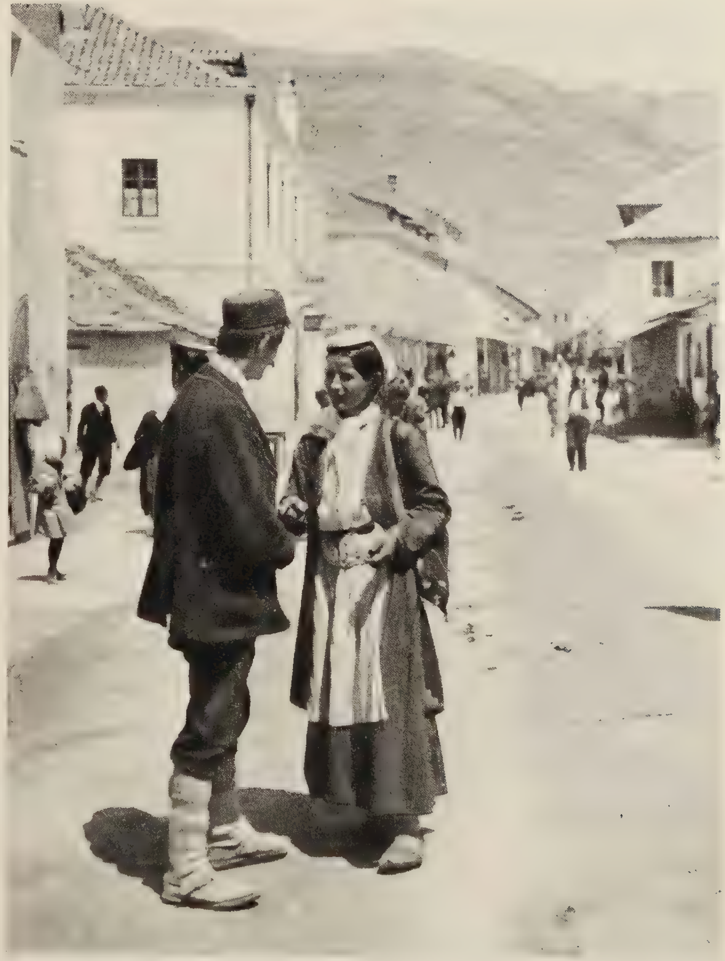
SARAJEVO GIRLS DISPLAY THEIR DOWRIES AS JEWELRY

It is easy for the Bosnian youth to learn how much to expect as a wedding settlement when he sets out to select a wife. Each of these young women wears her wealth of gold coins, the two on the left attaching them to their waists, the third fashioning a hair band and a belt of them, and the fourth using them for decoration of her blouse.



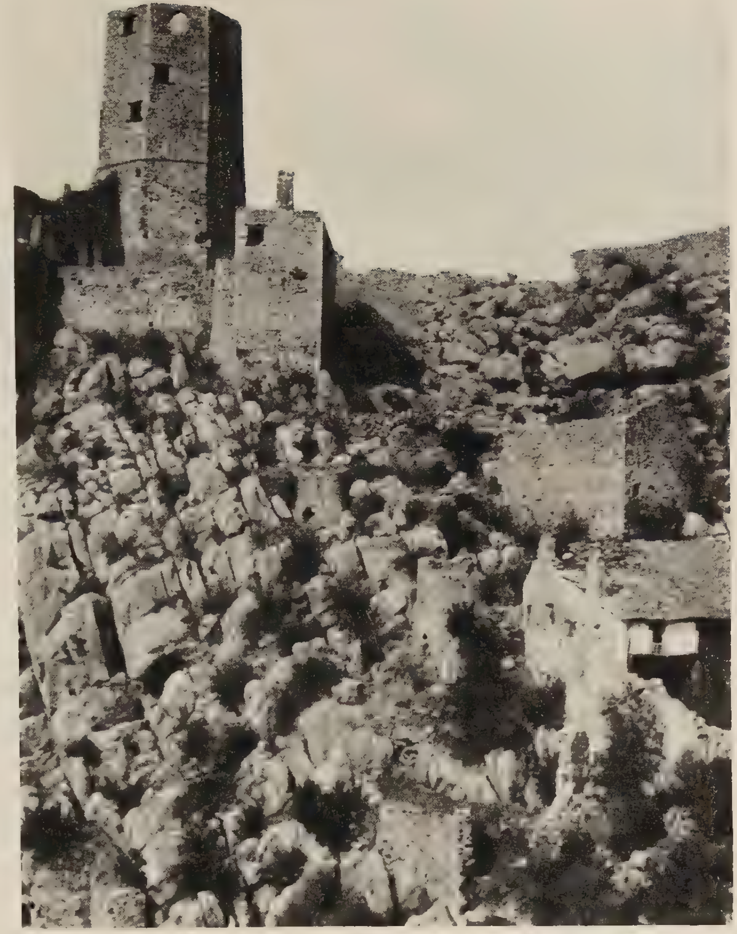
Photograph by Melville Chater

THE ARCHWAY OF THE OLD BRIDGE TO MOSTAR



Photograph by Alice Schalek

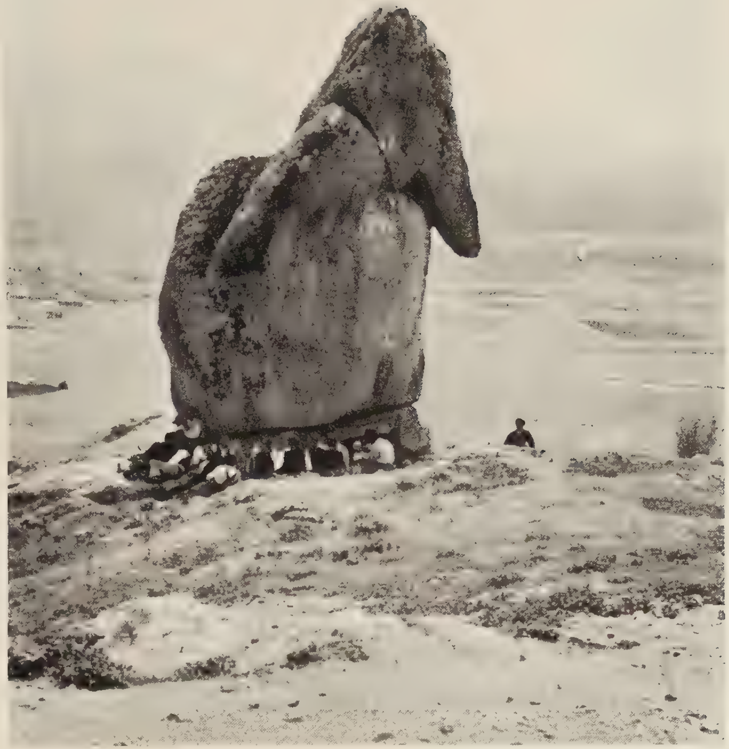
MANY FOLK OF TREBINJE RETAIN THE NATIONAL COSTUME



Photograph by Emil Mezer

POČITELJ'S FORTRESS IS FIVE CENTURIES OLD

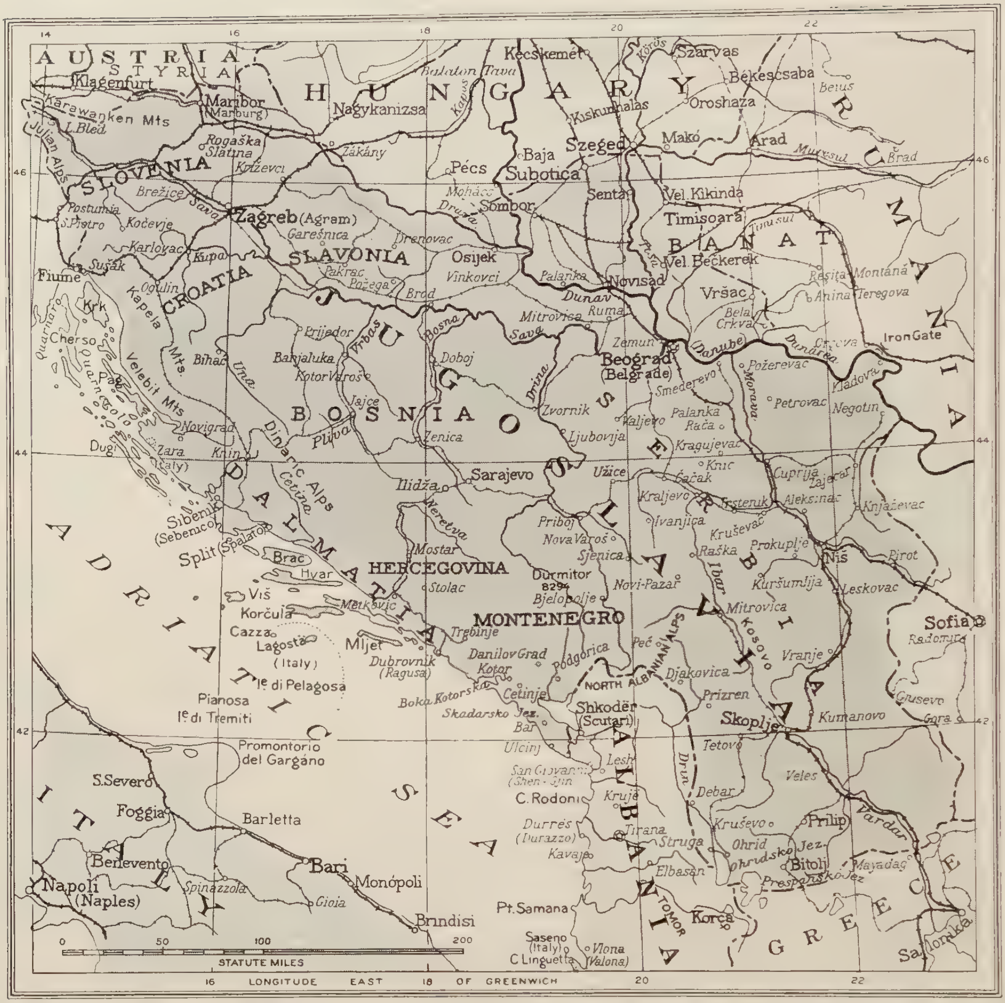
Many such relics of the Moslem conquest crown craggy heights in Hercegovina. This one overlooks the Neretva River near Mostar.



Photograph by Mabel Brown Ellis

A PELICAN IN STONE NEAR PRILIP

Serbian Christians fleeing from the Turks in 1389 worshiped at this rock in southern Jugoslavia.


AUSTRIA
STYRIA
Klagenfurt
Karawanken Mts
L. Bled
Julian Alps
Maribor
(Marburg)
HUNGARY
Nagykanizsa
Balaton
Tava
Kapos
Kecskemet
Körös
Szarvas
Bekescsaba
Beius
Kiskunhalas
Oroshaza
Mako
Arad
Muresul
Brad
Rogaška Slatina
Križevci
Zakany
Pecs
Baja
Szeged
Subotica
Mohacs
Drava
Sombor
Senta
Vel. Kikinda
Timisoara
Timisul
SLOVENIA
Brežice
Sava
Postumia
S. Pietro
Kočevje
Zagreb (Agram)
Garešnica
SLAVONIA
Drenovac
Osijek
Vinkovci
Karlovac
Kupa
Sušak
Fiume
Ogulin
CROATIA
Pakrac
Požega
Brod
Palanka
Dunav
Novisad
Vel. Beckerek
BANAT
Resita
Montana
Vršac
Anina
Teregova
Krk
Kapela
Quarnero
Cherso
Quarnerolo
Pag
Velebit Mts
Mts.
Bihać
Una
Prijedor
Vrbas
Banjaluka
KotorVaroš
Bosna
Doboj
Mitrovica
Ruma
Sava
Zemun
Beograd (Belgrade)
Danube
Bela Crkva
Dunarea
Orsova
IronGate
Požarevac
Morava
Smederevo
Petrovac
Kladovo
Negotin
JUGOSLAVIA
BOSNIA
Jajce
Pliva
Drina
Zvornik
Valjevo
Palanka
Rača
Zenica
Ljubovija
Kragujevac
Knic
Novigrad
Zara (Italy)
Dugi
Knin
Dinaric Alps
Cetina
Sarajevo
Ilidža
Užice
Čačak
Cuprija
Zaječar
Kraljevo
Trstenik
Aleksinac
Knjaževac
Ivanjica
Kruševac
Šibenik (Sebenico)
Split (Spalato)
Brač
Hvar
Viš
Korčula
DALMATIA
Neretva
Mostar
HERCEGOVINA
Stolac
Priboj
Nova Varoš
Sjenica
Durmitor 8294
Bjelopolje
Novi-Pazar
Raška
Ibar
Prokuplje
Niš
Pirot
Kuršumlija
Leskovac
Metković
Cazza
Lagosta (Italy)
Mljet
Dubrovnik (Ragusa)
Trebinje
MONTENEGRO
Mitrovica
Kosovo
Sofia
Radomir
Danilov Grad
Kotor
Podgorica
Peć
Vranje
NORTH ALBANIAN ALPS
Djakovica
Prizren
Gruševo
Gora
Boka Kotorska
Cetinje
Skadarsko Jez.
Shkodër (Scutari)
Skoplje
Kumanovo
Bar
Ulcinj
Tetovo
Lesh
Veles
San Giovanni (Shen-Gjin)
C. Rodoni
Kruje
Drin
Debar
Vardar
Durrës (Durazzo)
Kavaje
Tirana
Struga
Kruševo
Prilip
Ohrid
Ohridsko Jez.
Bitolj
Mayadag
Elbasan
Prespansko Jez.
ALBANIA
Tomor
Korça
Pt. Samana
Saseno (Italy)
C. Linguetta
Vlona (Valona)
GREECE
Salonika
ADRIATIC SEA
I. di Pelagosa
Pianosa
I. di Tremiti
Promontorio del Gargano
S. Severo
Foggia
Barletta
ITALY
Benevento
Napoli (Naples)
Spinazzola
Bari
Monopoli
Gioia
Brindisi
0 50 100 200
STATUTE MILES
14 16 18 20 22
46 44 42
16 LONGITUDE EAST 18 OF GREENWICH 20 22

JUGOSLAVIA IS AN AMALGAMATION OF MANY STATES

After the World War, Slovenia, Croatia, Slavonia, Bosnia, Hercegovina, Dalmatia, part of Banat, and the Kingdom of Montenegro were added to Serbia to compose a kingdom of 96,000 square miles, with a population of 13,000,000.

breederies at Ilidža, near Sarajevo, stir the fishing fan's heart with an unholy covetousness. We were later to make the acquaintance of those Ilidža trout under unusual circumstances.

Thanks to a Mostar acquaintance, we learned that the "wild man's burying ground" was a Patarene cemetery. Those heretics, earlier known as Bogomils, anticipated modern skepticism as to Christ's divinity, the sacraments, and the miracles by some ten centuries. Although they were severely persecuted, Bogomil propaganda spread westward over Europe's mountain chains. Many of the sect took refuge in the Bosnian wilds, holding out until the end of the fifteenth century, when they were engulfed by Islam.

SCENIC GRANDEUR REPLACES DESOLATE WASTES

The Karst region was now behind us and scenic rewards lay ahead. Next day we threaded a mighty canyon, some 18 miles long, where the Neretva rushed headlong between skyscraping walls of rock. Here, during seasonal high waters, the river sometimes rises from shallowness to 40 feet in depth during 24 hours.

We were yet to realize how essentially Jugoslavia is a land of waterways and of largely undeveloped water power. The

Danube and its branches alone give her almost 1,000 miles of navigable routes, this in a State slightly smaller than Wyoming. These, together with unnavigable streams, give Jugoslavia a total potential energy in some seasons of almost 9,000,000 horsepower.

An hour or so beyond the canyon we began to skirt magnificent stands of oak, birch, and evergreen. We gained the top of the watershed, then coasted down into well-watered, forest-ringed plains, where lumber mills were interspersed among those busy little grain mills, almost toylike in size, that multitudinously range themselves along every Bosnian stream.

A land of abrupt transitions! Within 24 hours we had successively observed Dalmatia's semitropic luxuriance, Hercegovina's sterile Karst, and a forest region which contains some of the finest stands of timber in Europe. In a kingdom which is one-third forested and reckons one-third of its industrial values in terms of wood or wood products, Bosnia-Hercegovina leads, with 50 per cent of its surface classifiable as "forest area."

Bosnia possesses one of the largest wood-distilling plants on the Continent. "Bosnian oak staves" have contributed a trade phrase ever since the days when the country exported 60,000,000 of them annually. And it may surprise city folk, who are more aware of shoe-trees than tree-shoes, to know that Jugoslavia turns out 600,000 pairs of sabots a year.

PEACE PREVAILS WHERE THE WORLD WAS SENT TO WAR

That night we sat outdoors over our coffee in hill-cupped Sarajevo. A peaceful evening, a strolling crowd, a boulevard paralleling the moon-kissed river. Not a stone's throw away rose the bridge from near which, in June, 1914, was fired the revolver shot whose echoes shook the world (see Color Plate II).

A local acquaintance, young Abdul of the gazelle eyes and tilted fez, was giving us Sarajevo's traditional account of the Archduke's assassination. As is usual in Balkan political exegesis, he started off with causes in the Middle Ages and gradually worked down to effects in modern times. He said that the Southern Slavs' struggle for independence began with the uprisings of 1804-1813. During the next decade there had developed the foundations of a new Serbian State, which thenceforward assumed the rôle of liberator. Three subsequent wars against the Turks, and especially that of 1912, had served to heighten Southern Slavism's hopes, much to the anxiety of their Austro-Hungarian rulers.

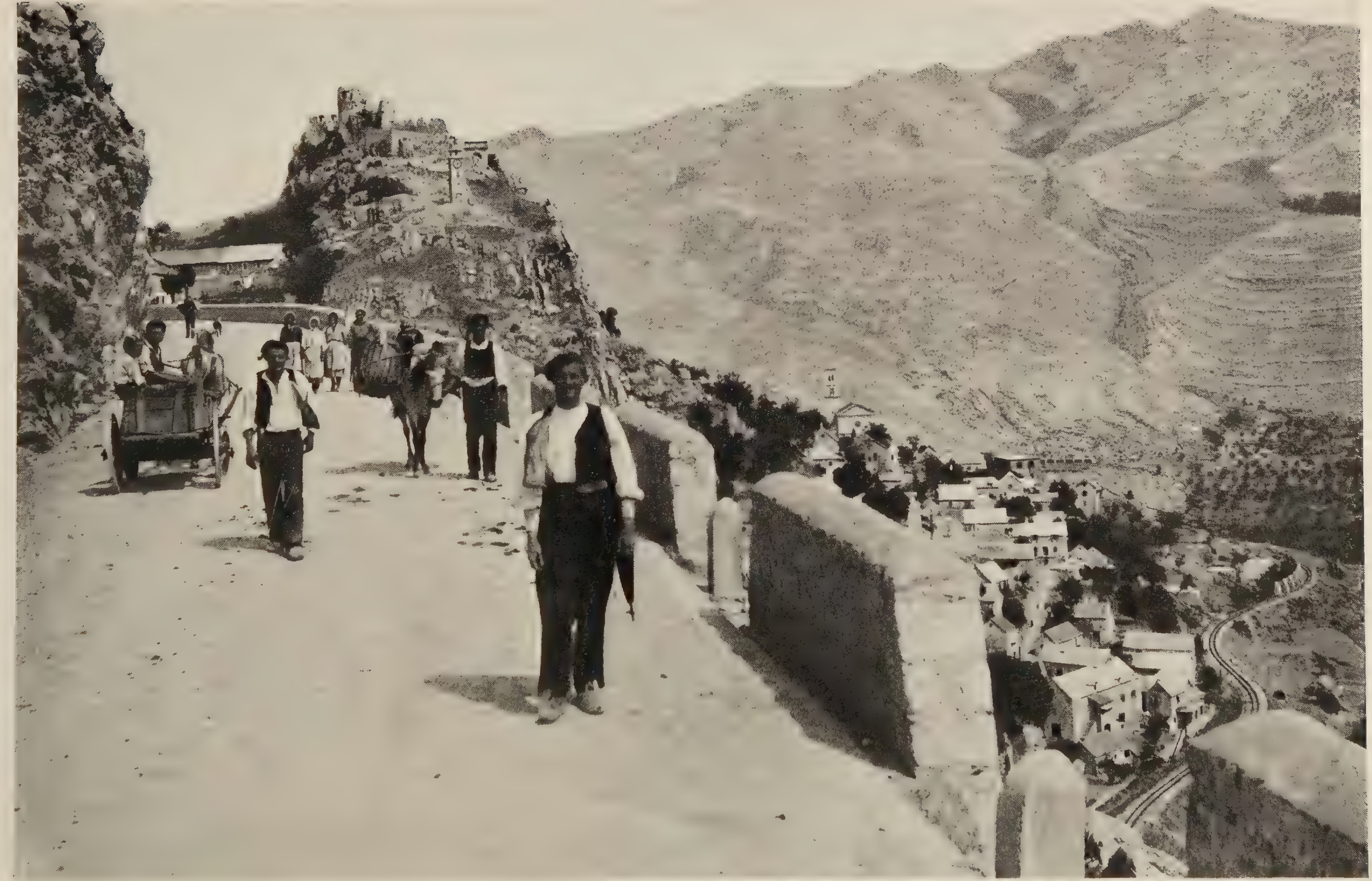
"The Archduke," he went on, "was here to inspect maneuvers. Now, such displays weren't very popular among the young Bosnian nationalists. Several of those in the plot had actually written to friends in Austria, 'Watch for big happenings on June 28.'

"Well, the first thing that happened was an unsuccessful bomb that landed in front of the Archduke's car. He summoned the mayor and said angrily, 'I expect to be greeted with flowers, not with bombs.' But no amount of police protection would have availed, for as many as thirty assassins were stationed along the line of march. The second one, pushing through the cordon, killed the Archduke and his consort with two revolver shots—an affair of five seconds that changed the map of Europe."

VEILS AND FEZZES STILL WORN IN SARAJEVO

Next morning we trickled through the thronged *Čarsija,* Sarajevo's bazaar quarter, with Abdul's red fez ahead of us as a beacon. But a derby "lid," such as Constantinople has imposed upon its Moslems, would have proved, among the Čarsija's sea of fezzes, a far more effective landmark; for Sarajevo's 20,000 Mohammedans, placidly indifferent to Western costume, remain draped, veiled, and fezzed as of old, with the result that Constantinople's streets now appear pale when compared with the glowing pageant of Bosnia's capital.

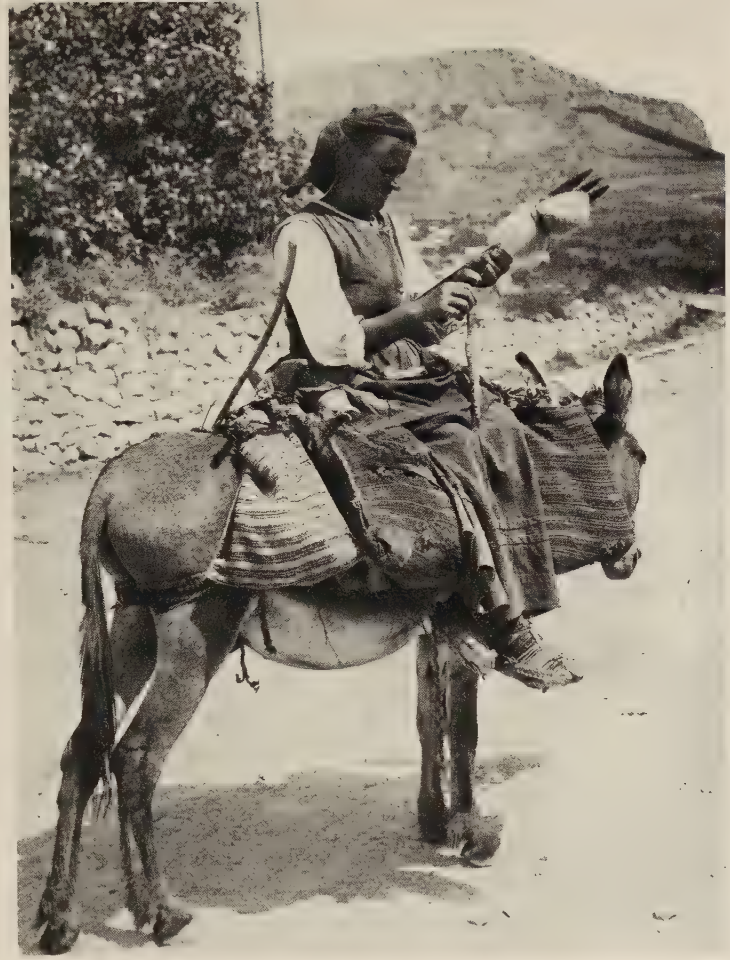
Despite its prevailingly European architecture and its occidental race elements in a population of 80,000, Sarajevo remains for Europe the westernmost of oriental cities. Her bulbous mosques, their spacious fore-courts, their groups of foot-washers or of kneelers, abased, slavelike as under Allah's hand; her hundred minarets, rising heavenward like altar candles; the black-veiled figures gliding phantomlike past; the courtyard caravansaries, the fragrant kebabs sizzling on charcoal; the



Photograph by Ewing Galloway

AMONG ROCKY DALMATIAN HIGHLANDS LIES THE ROMANTIC VILLAGE OF KLIS (CLISSA)

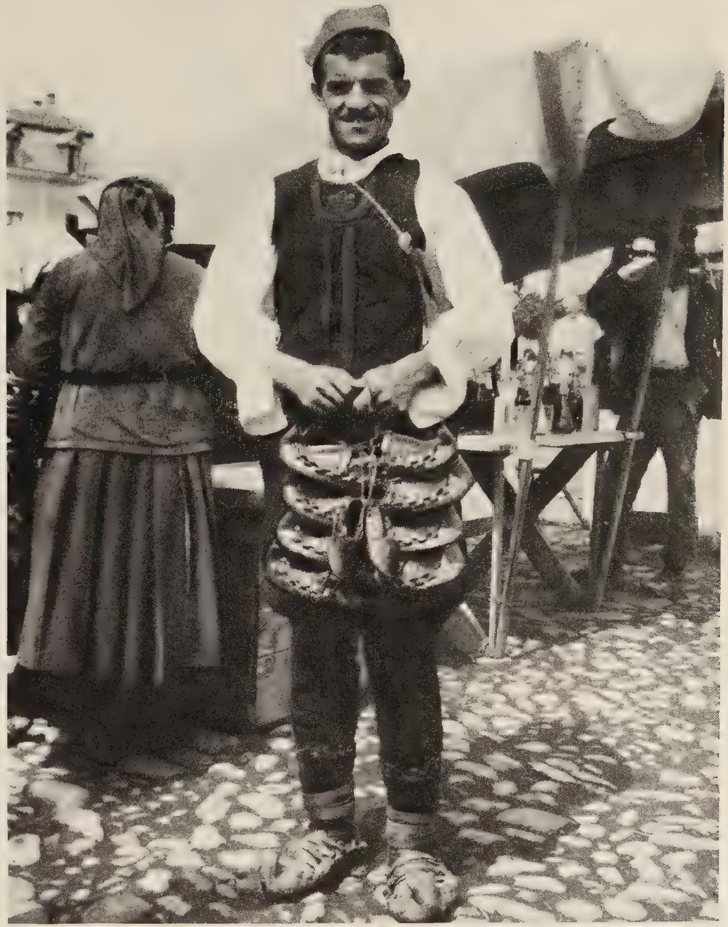
The old castle on the promontory at the upper left was an important stronghold in the Turkish wars. Across the valley Monte Mosor looms. People of this district gain a livelihood by sheep-raising and farming, though there is little tillable soil in the rough hill country. The sinuous railway and the mountain road hewn by generations of peasants link the town to Split (Spalato).



Photograph by Ewing Galloway

SPINNING RELIEVES THE MONOTONY OF DONKEY TRAVEL

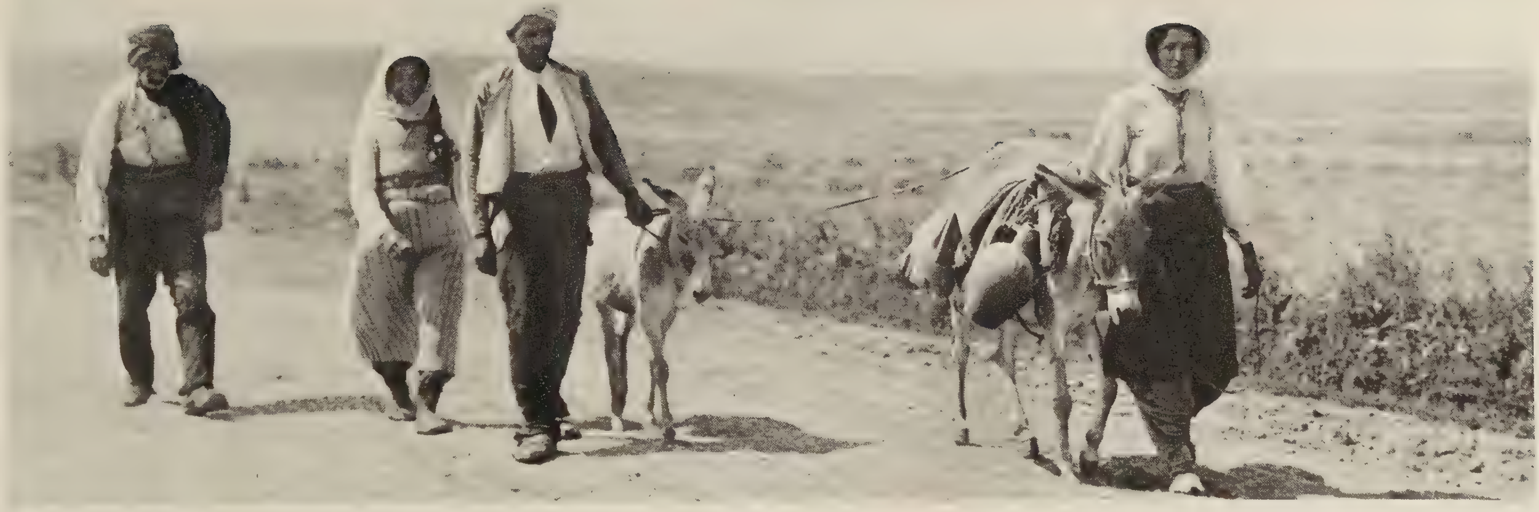
On her way to the village of Klis (see illustration, opposite page) the Dalmatian woman loses no time from her housewifely duties.



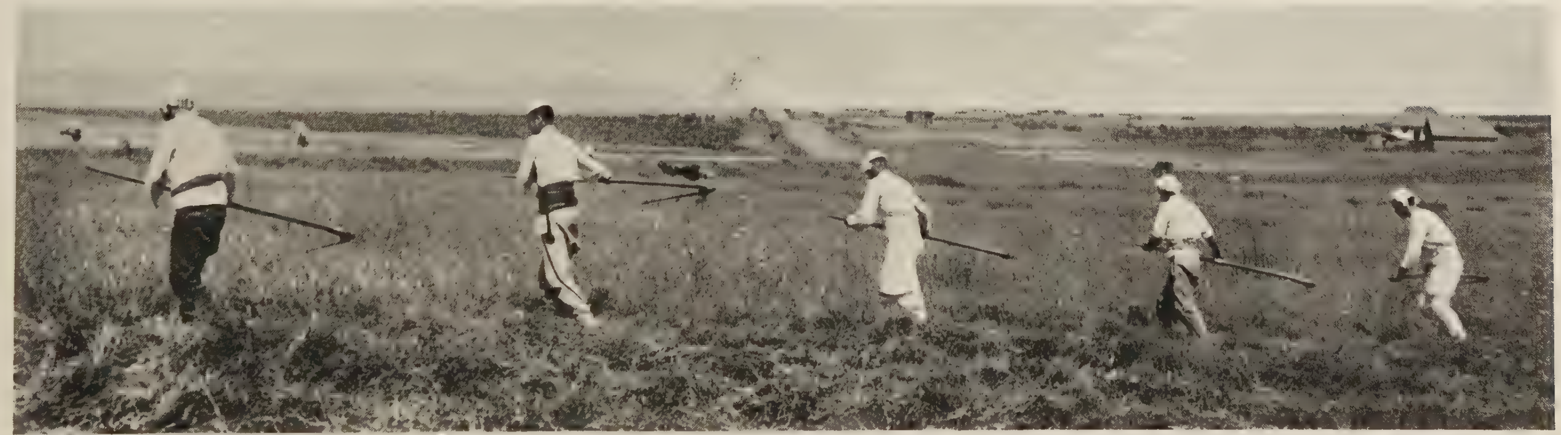
Photograph by Bertram Brotherton

A UŽICE SHOE MERCHANT

Many Serbian peasants make their own footwear, a sort of leather moccasin. The merchant has on a pair similar to those he carries.



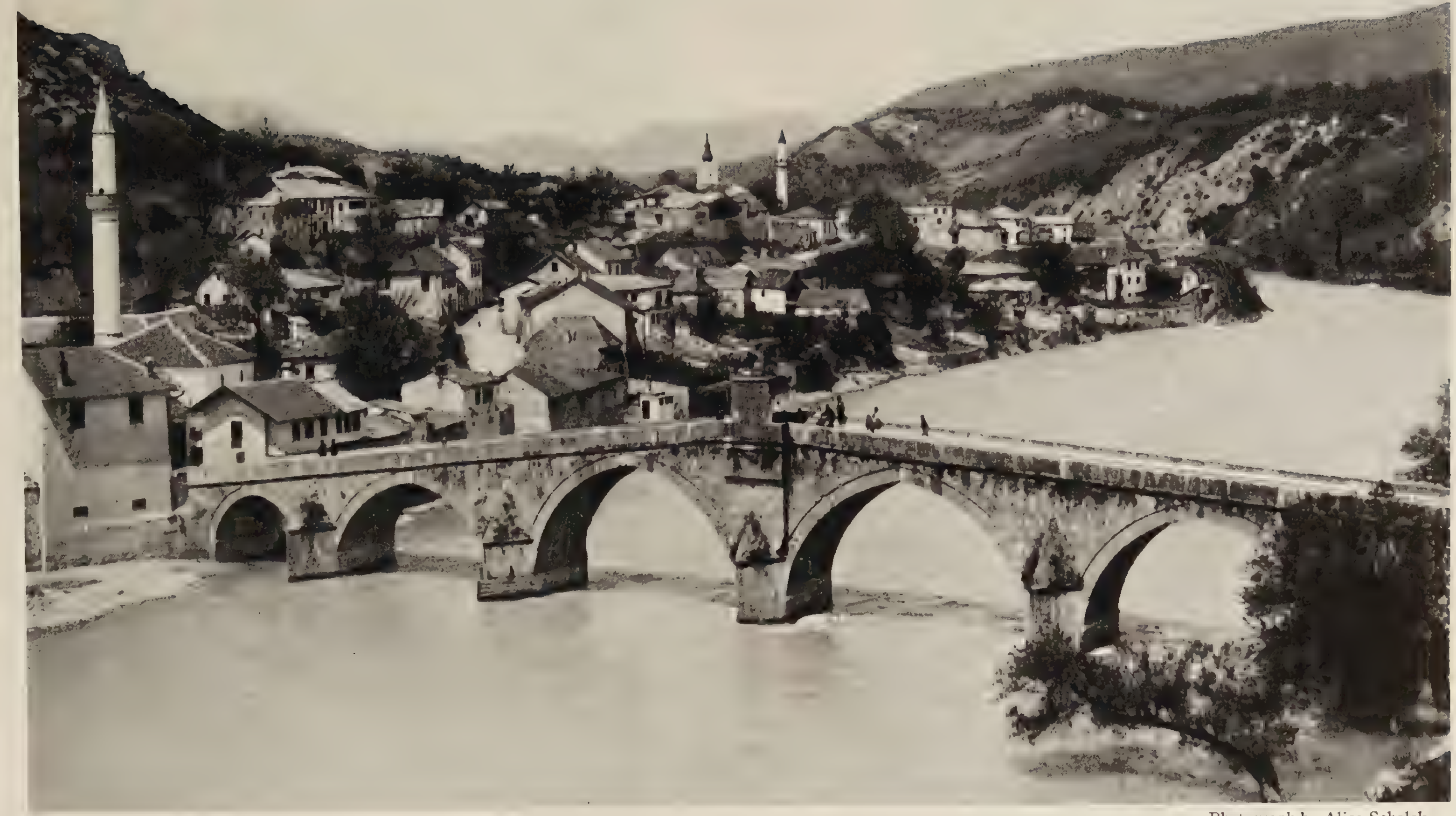
WHERE THE EAST BEGINS, DONKEYS COME INTO USE AS PACK ANIMALS: PEASANTS ON THEIR WAY TO MARKET ACROSS THE PLAIN OF KOSOVO



Photographs by Hans Hildenbrand

AGRICULTURAL MACHINERY IS ALMOST UNKNOWN IN SOUTHERN JUGOSLAVIA

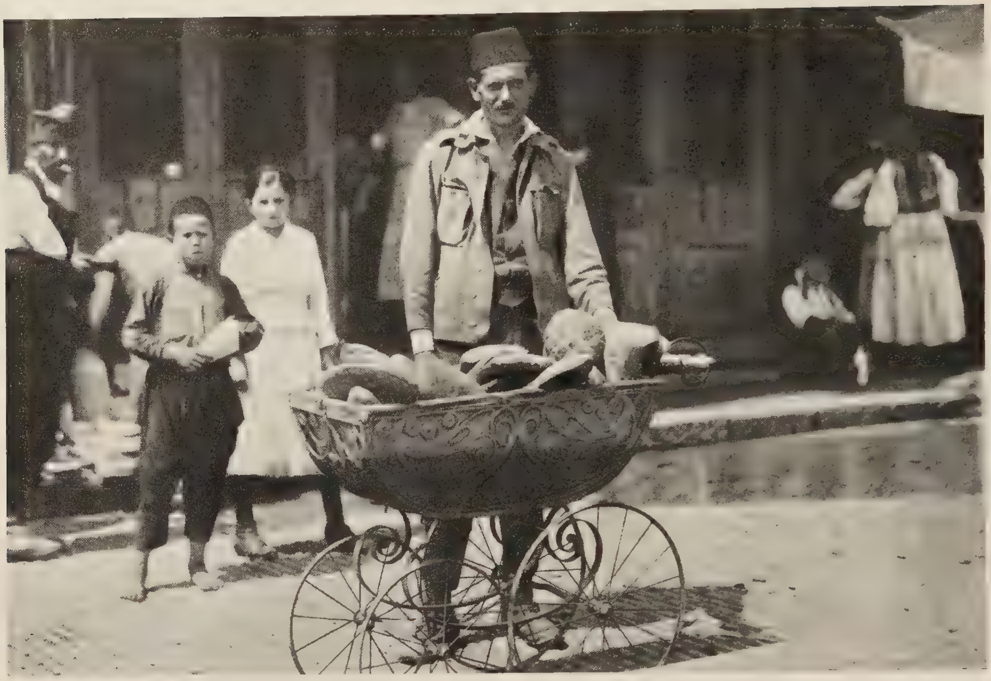
Peasants are cutting grain from Kosovo Polje (the Plain of the Blackbirds), scene of the battle between the South Slavs and the Turks, in which the former lost their independence (see, also, Color Plate XIV).



Photograph by Alice Schalek

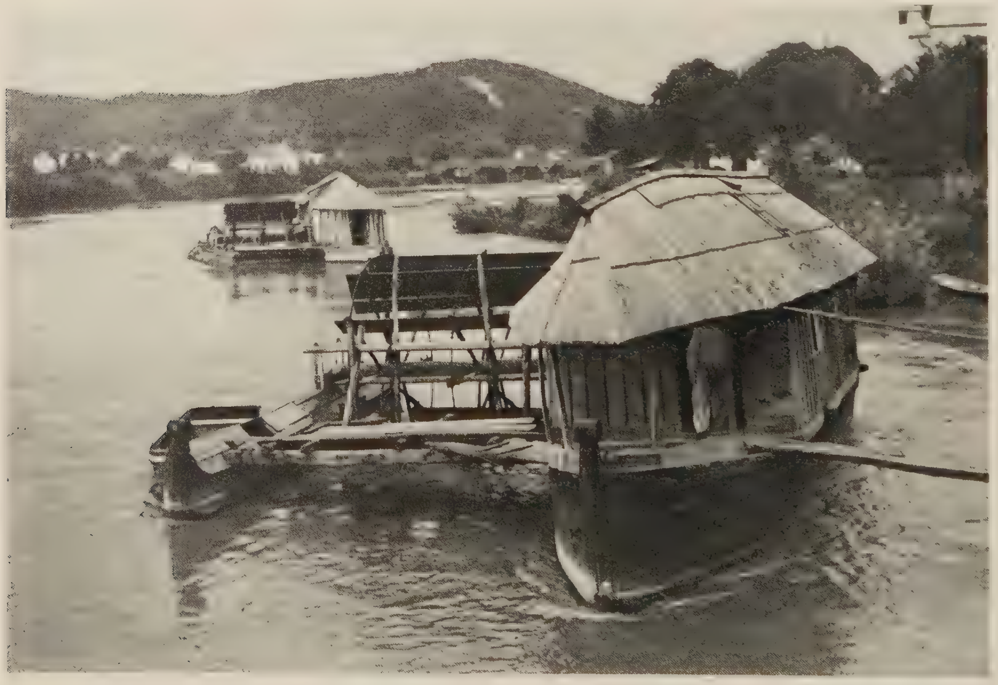
THE BRIDGE ACROSS THE NERETVA AT JABLANICA ONCE RANG TO THE TRAMP OF ROMAN LEGIONS

With its Moslem mosques, ancient structures, and impressive mountain scenery in the vicinity, this village between Sarajevo and Mostar attracts many travelers.



Photograph by Merl La Voy

HIS SARAJEVO BREAD WAGON BEGAN SERVICE AS A BABY CARRIAGE



Photograph by Rudo Bruner-Dvořák

FLOATING MILLS GRIND THE GRAIN FROM BOSNIAN RIVER FARMS

In the World War these devices were pressed into service for the construction of pontoon bridges for the passage of troops.

Photograph by Melville Chater

KNITTING KEEPS HERCEGOVINA OUT OF MISCHIEF BETWEEN HOME AND SCHOOL

Photograph by Atelje Vlada Benčić

WHEREVER SERBS MAKE MERRY, THE KOLO IS DANCED

Even in World War trenches, soldiers of this hardy people kept up their spirits by joining hands and circling about in the steps of their national dance.

amazing craftwork in leather and in metal, wrought along dark alleyways of floorless, impermanent booths—of such scenes Sarajevo creates the timeless mosaic of oriental life. Yes, here is the very essence of the hodgepodge, lovable East, lying so strangely juxtaposed to Adriatic coasts of campanile and cathedral.

TREASURES OF FOUR CENTURIES UNFOLD

"And now," said Abdul, "I will show you our family storeroom, which we have owned ever since coming from Trebizond, centuries ago."

Leading the way, he presently applied a gigantic key to a ponderous door. We found ourselves in a dim storage vault of the seventeenth century; or, rather, it was a kind of Ali Baba's cave, odorous of attar and aflash with gold. Then Abdul switched on the lights, and we saw that the "gold" was appliquéd as exquisite tracery over a series of the most magnificent gowns, flowing-sleeved dalmatics stiff with brocade, that ever adorned the wife or daughter of some Bosnian merchant prince.

"Mohammedan work, but only two centuries old," said Abdul patronizingly. "And there are rugs——"

He tossed them out of deep chests—subtle Persians, glamorously barbaric Afghanistans, and a Damascene of which only four originals are known to exist. We gloated, we burbled inadequately.

"I know," sighed Abdul, eyeing us with hypnotic sympathy, "you look at the Damascene; you want to keess it. Now you begin to feel a little seeck, yes?" (He meant "faint.") "Effendim, hadn't I better put this too lovely mistress of a rug out of sight?"

Yes, for supersalesmanship I will back Abdul, of the gazelle eyes and flutelike voice, against any rug department spellbinder that ever lived.

Abdul's ancestral storeroom remains a relic of the old days, when Sarajevo flourished exceedingly as a caravan stop on the Venice-to-Constantinople route. Trans-Adriatic merchandise arriving by galley at Dubrovnik was reloaded on mules; then the caravan wound its way eastward across the wild Karst. Half a mile ahead marched the expedition's least-envied man, beating a drum. So long as the sound continued, one knew that all was well. If the sound ceased, one fled, realizing that the scout had been killed by brigands.

Some work on our car having become necessary, we occupied the interim with a rail trip into South Serbia. Over a narrow-gauge line we climbed eastward through a succession of remote mountain defiles and Alpine lowlands. Beyond Užice we descended through the Morava Valley into wide plains; then headed southward for Skoplje (Uskub).

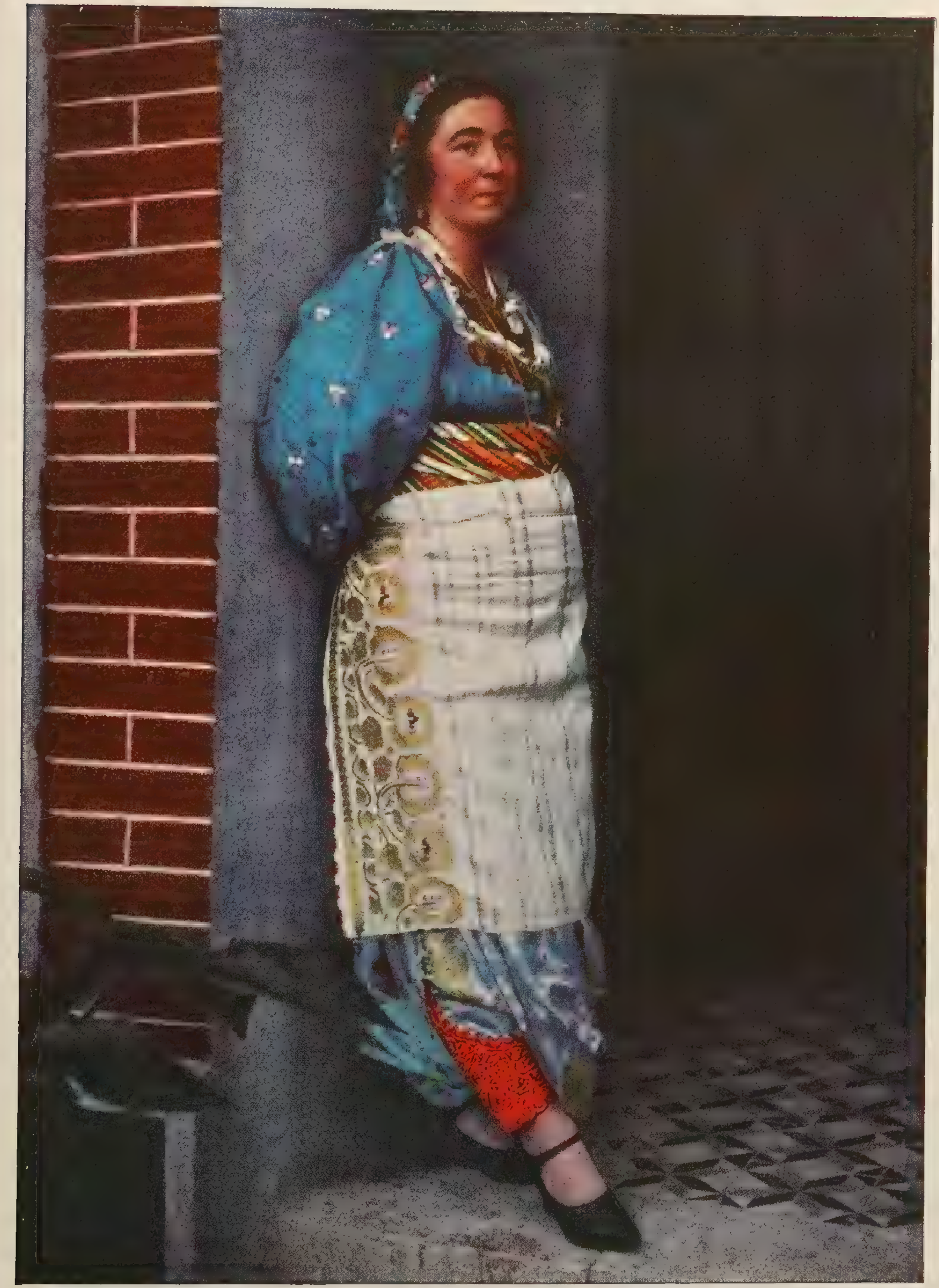
PRIMITIVE FARMING METHODS PERSIST

After many hours' passage across the Serbian plain, one is left with the impression that it alone might suffice as the granary of Jugoslavia's 13,000,000 people. On the other hand, one is constantly amazed at the primitive condition of a farming folk who were among the initiators of agricultural coöperatives.

The Serbs' native adaptability to cooperatives may in part be due to their traditionally small (20-acre) farm holdings. Even more it may be traceable to the *zadruga,* under which time-honored arrangement married sons or sons-in-law simply "built on" to the patriarchal dwelling until a family of perhaps sixty might be living beneath one roof.

At any rate, the Southern Slavs' history has been bound up with the soil ever since, in the 6th century, they poured down from Poland, Galicia, and the Carpathians. Gradually they spread westward and southward, lured by the fertile plains of future Jugoslavia. But the little agricultural kingdoms of the Croats and Slovenes passed out of the picture when the Magyars arrived. Of the three Southern Slav branches, the Serbs alone remained independent, developing under the Nemanyich dynasty toward a comparatively high cultural level in architecture, law, and literature.

Foreigners are few and obvious in that corner of South Serbia where well-garrisoned Skoplje faces the Greek and Bulgarian frontiers. Mysteriously enough, Skoplje had been apprised that four foreigners would descend from the 3:42 train. When a smart military aide stepped up as we stepped off, we were rather doubtful whether his greeting in Serbian meant, "Welcome to our city!" or "Welcome to

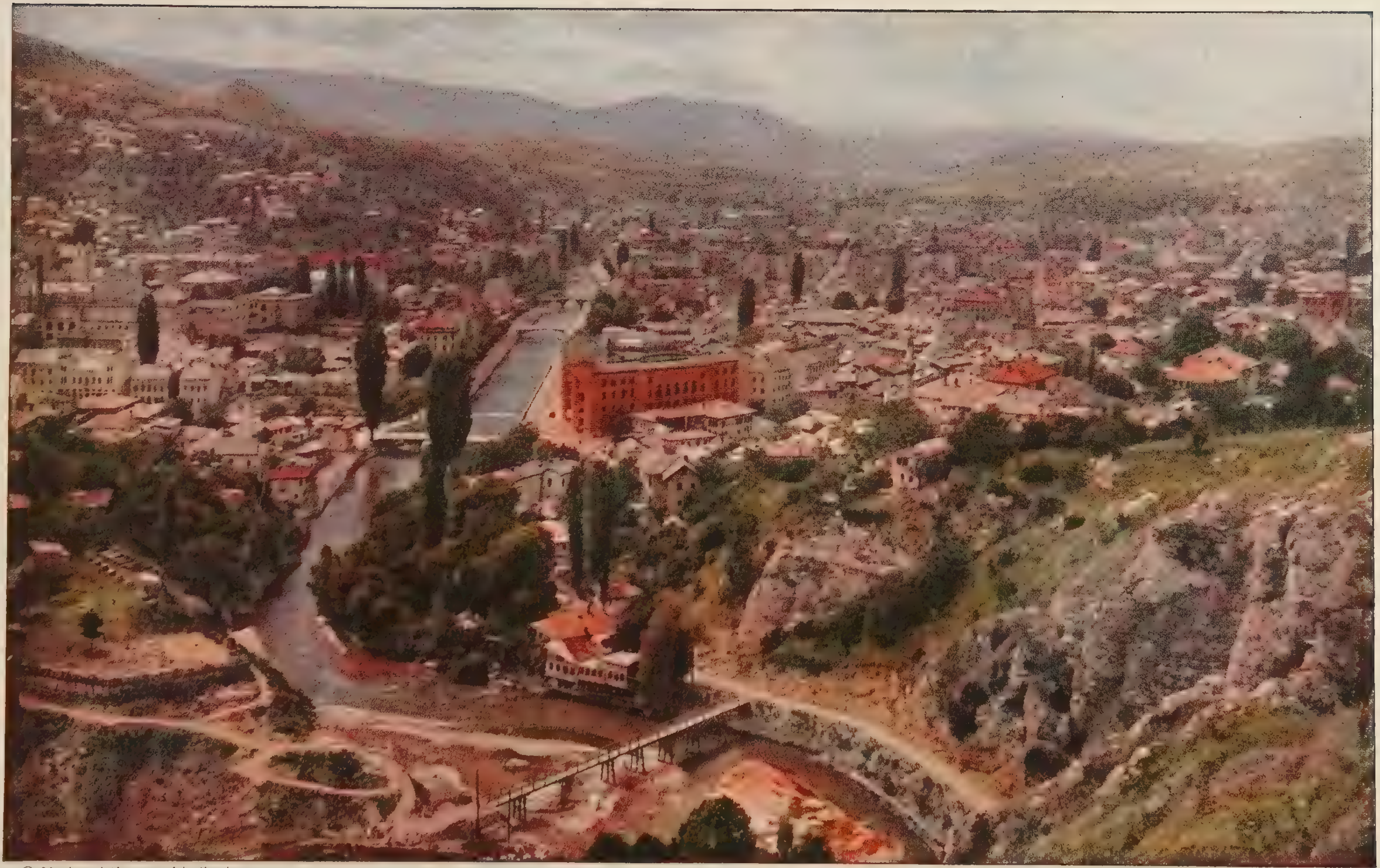


© National Geographic Society

Natural-Color Photograph by Hans Hildenbrand

A LADY OF PRIZREN'S FOUR HUNDRED

Here costumes still show the influence of those days not so long past when ladies of the pasha's harem set the styles in feminine attire.

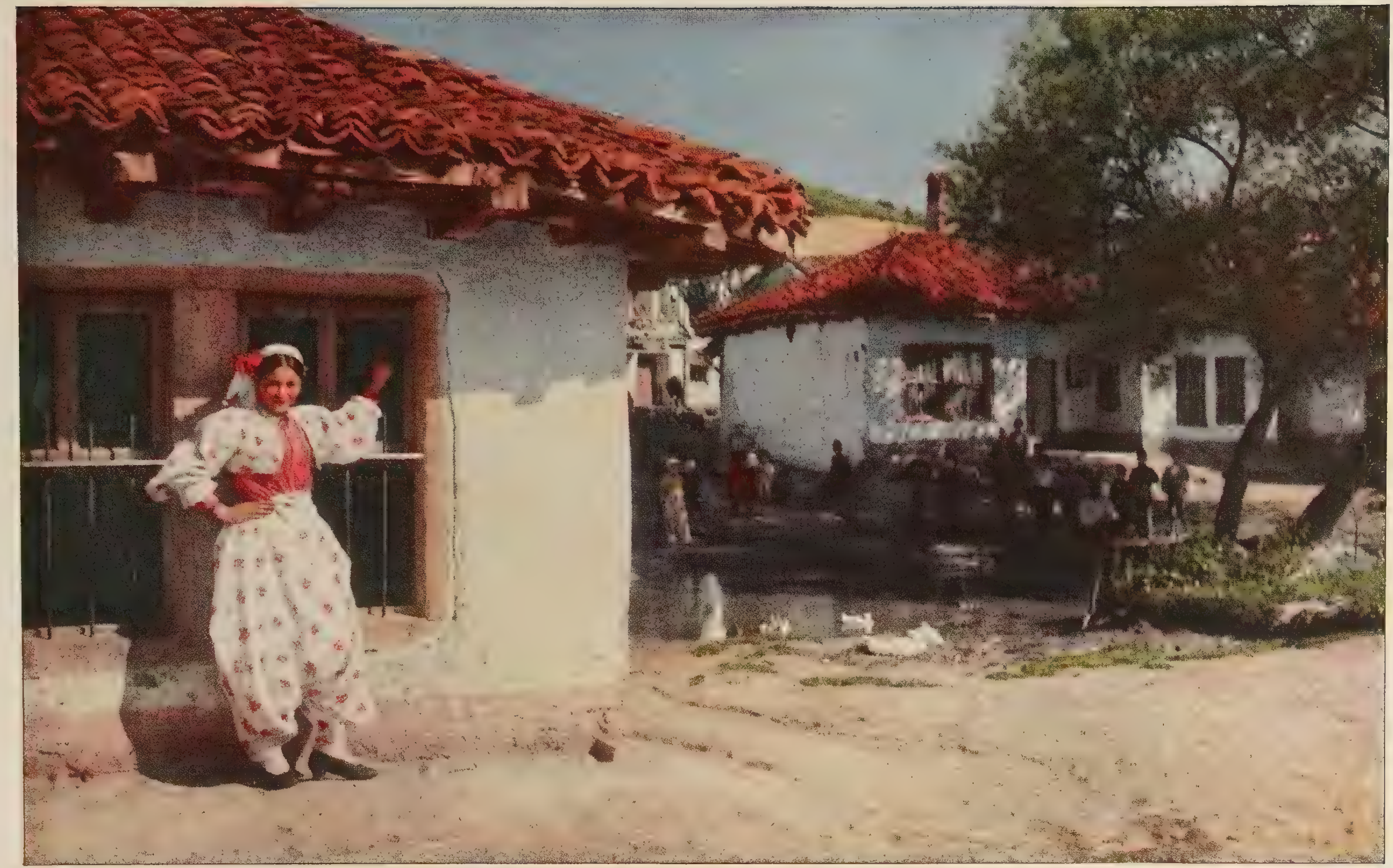


© National Geographic Society

Natural-Color Photograph by Hans Hildenbrand

AT SARAJEVO WAS STRUCK THE BLOW THAT SENT A WORLD TO WAR

Here, in July, 1914, the Austrian Archduke Francis Ferdinand and his wife were assassinated by a fanatical student. The events that followed resulted in declarations of war by most of the great nations of the world. It was just before crossing the last bridge visible in the picture that the Austrian visitors were killed. The attractive city that is Sarajevo of to-day is replacing an older community cast from the Turkish mold.

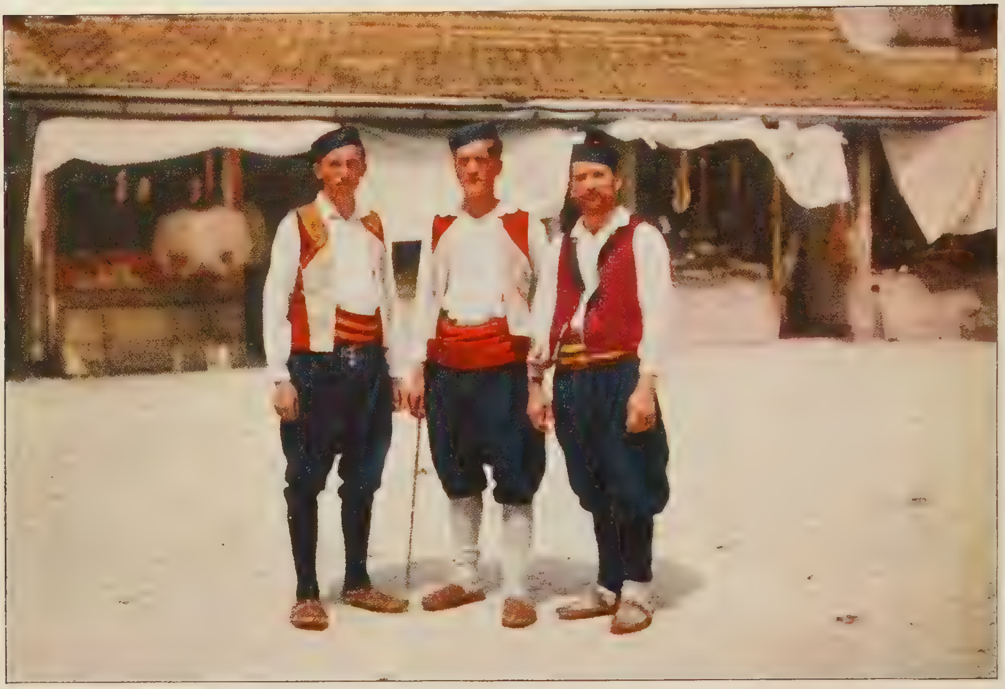


© National Geographic Society

Natural-Color Photograph by Hans Hildenbrand

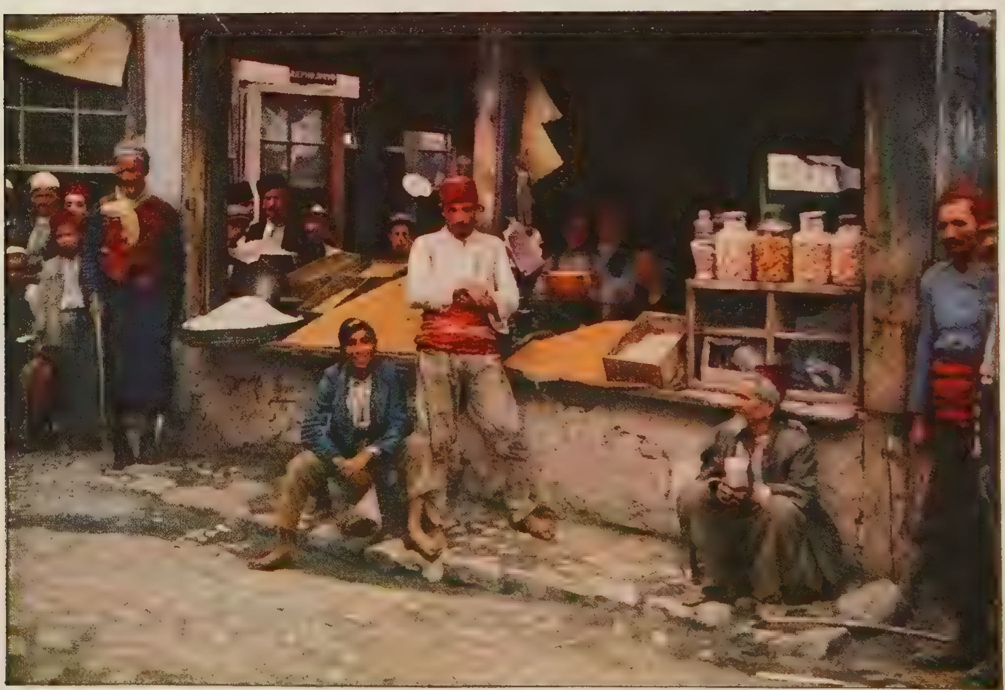
GYPSIES ARE NUMEROUS IN THE LANDS OF THE SOUTHERN SLAVS

Unlike their brethren in most other parts of the world, these gypsies are not nomads and generally have at least semi-permanent homes. They frequently inhabit the suburbs of the cities and follow agricultural pursuits for a livelihood. To augment their incomes, many of them play in bands and orchestras at night. The girl is from a gypsy settlement near Priština, a town of Jugoslavia.



THEY DWELL NEAR A CRADLE OF BALKAN LIBERTY

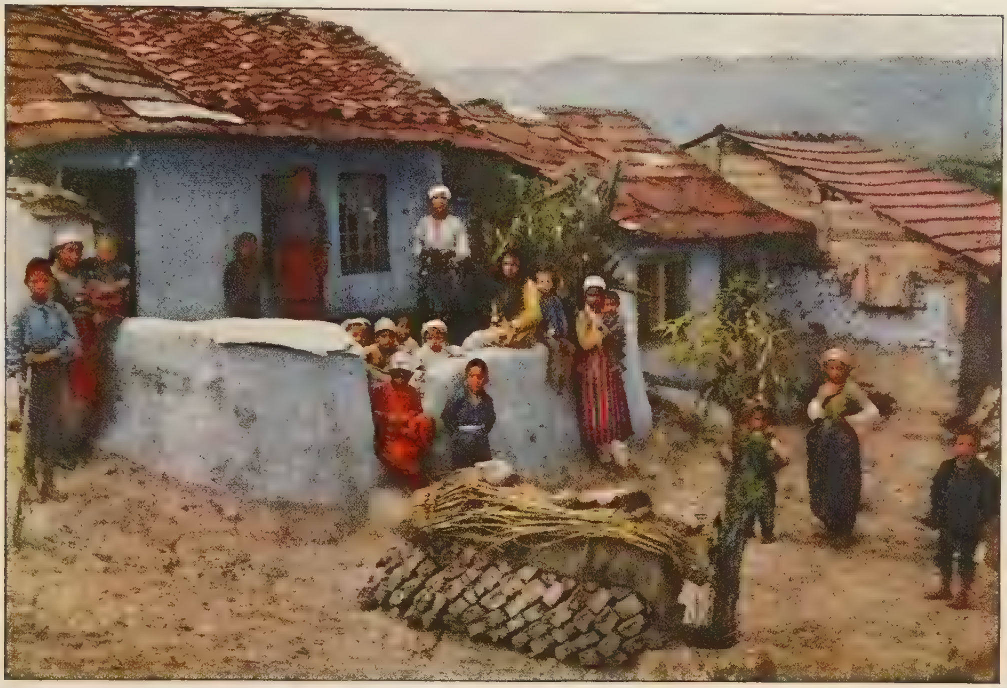
Hercegovina is a land of rocks and mountains and remote valleys. Its people are confirmed nationalists and repeated foreign oppressions have failed to dim the spirit of liberty among them. Peasants from the Breno Valley in the marketplace at Trebinje.



© National Geographic Society Natural-Color Photographs by Hans Hildenbrand

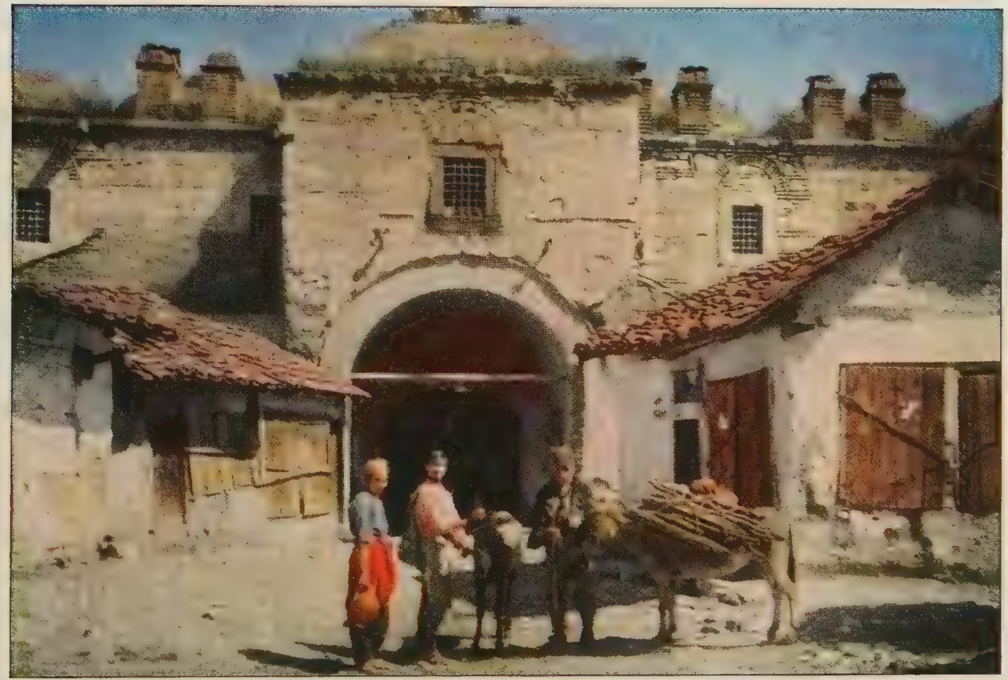
FOLLOWERS OF THE CROSS AND CRESCENT MINGLE PEACEABLY HERE

Christians and Mohammedans experience little difficulty in living together harmoniously at Skoplje. This town, which is fast developing into a metropolis of the new South Slav Nation, has a large Mohammedan population.



SONS AND DAUGHTERS OF ROMANY

So great is the Serbian gypsies' love of music that their violins accompany them wherever they go. The gypsy soldiers on occasions have even taken the instruments into battle with them. The wood stacked in the yard has a covering of straw to keep it dry.

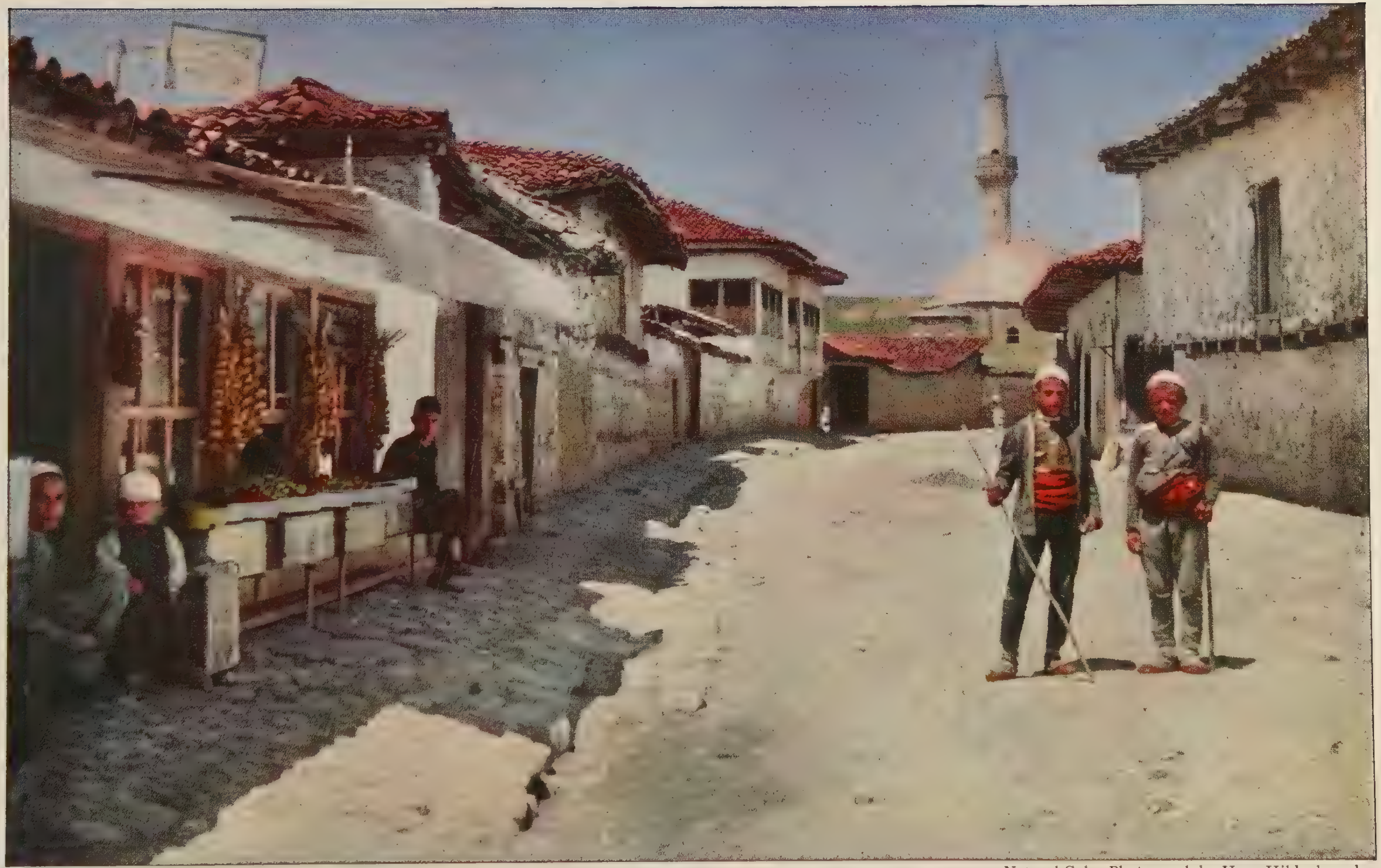


© National Geographic Society

Natural-Color Photographs by Hans Hildenbrand

REMINDERS ARE FREQUENT OF DAYS WHEN THE TURK RULED THIS LAND

Many of the buildings of southern Jugoslavia are of Moslem architecture and recall the fact that for five centuries Turkish power was supreme there. Except among the mountains, the climate is mild in this region and wood is largely used for fuel.



© National Geographic Society

Natural-Color Photograph by Hans Hildenbrand

MANY OF PRIŠTINA'S STREETS COULD PASS FOR ASIAN BYWAYS

As in so many other parts of southwestern Europe, the minaret and skullcap are much in evidence. The two boys standing in the street are Albanians. Note the strings of onions hanging by the windows. The Serbs are high seasoners, with a special fondness for paprika and onion.

© National Geographic Society

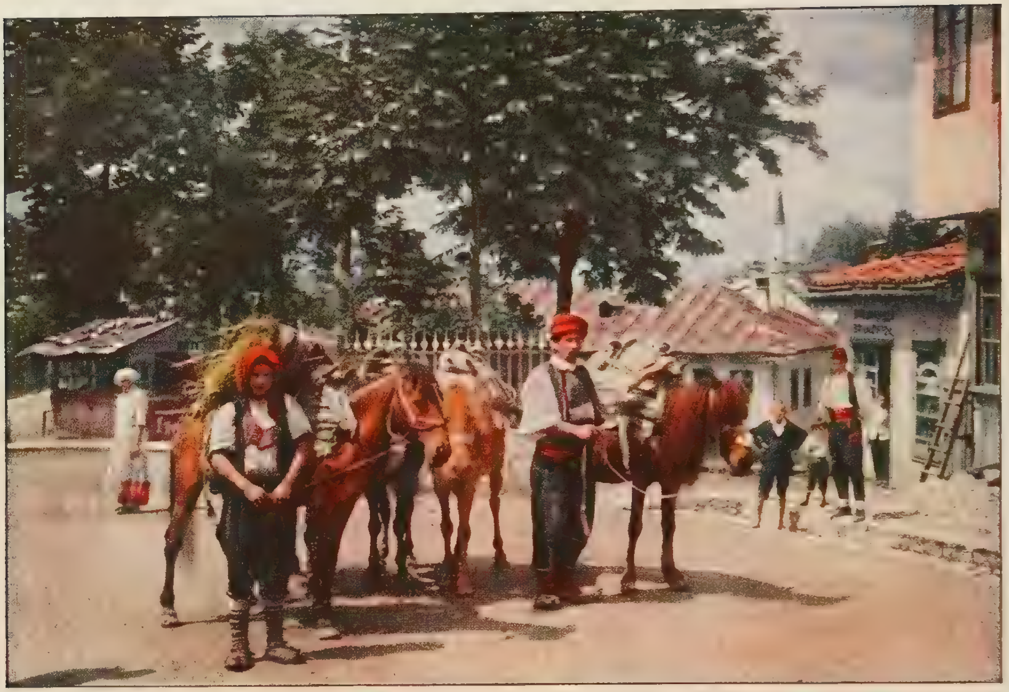
PRODUCTS OF THE PEASANT POTTER'S WHEEL

While the ceramic industry in Jugoslavia is not of great importance commercially, people of the small towns and countryside are proficient enough at the potter's art to satisfy most of their own needs.

Natural-Color Photographs by Hans Hildenbrand

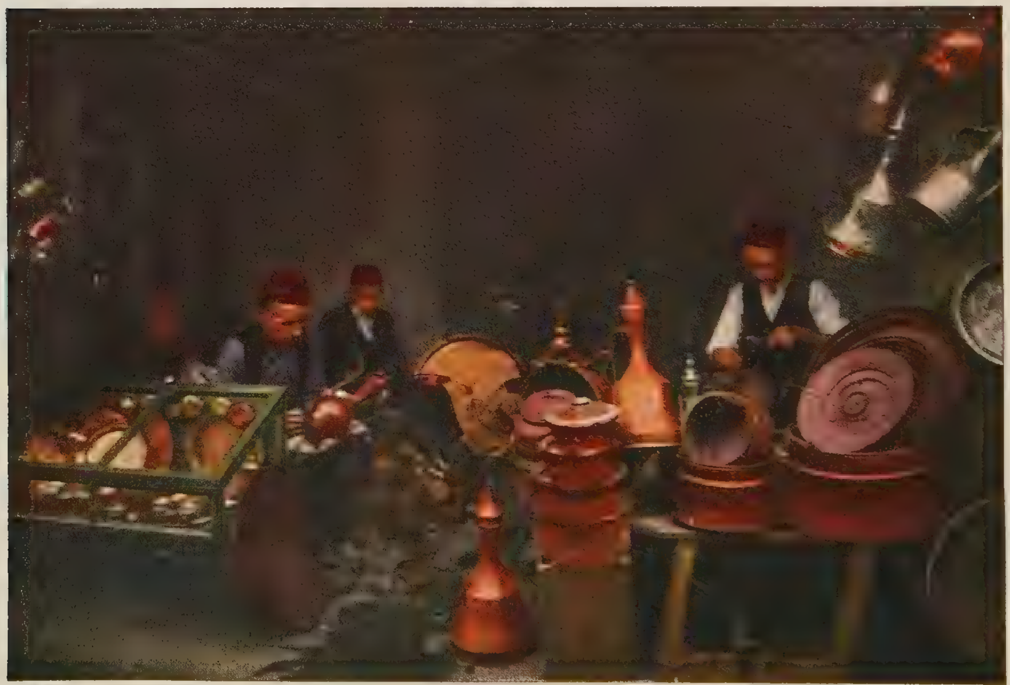
HERCEGOVINIAN GIRLS IN GAY ATTIRE

Peasant women of Trebinje bedeck themselves elaborately for market days, when they bring to town peaches, pears, cherries, apricots, grapes, tobacco, and other products of orchard and field.



HORSES PLAY A MAJOR RÔLE IN BOSNIA'S ECONOMIC LIFE

Land holdings are small here and each peasant works his own farm. His horses are strong, sure-footed, and docile. The sturdy little animals also serve with mountain artillery units.



© National Geographic Society Natural-Color Photographs by Hans Hildenbrand

EACH TRADE HAS ITS OWN STREET IN THE BAZAAR QUARTER

A large number of the people of Bosnia are Mohammedans and the customs of the East are woven into their daily life. Their fezzes indicate that these coppersmiths of Sarajevo are Moslems.

our jail!" And we were personally conducted to a hotel and personally deposited in separate bedrooms while still wondering if these attentions augured fetters or flowers.

Our minds were set at rest, however, when we were annexed by a delightful Serbian colonel, who showed us Skoplje inside and out. More, he turned it for us into a tourist's paradise. No waiting on thresholds, no fights with cabmen, no trailing beggars! Upon his approach, doors flew open, mendicants scattered, cabmen kotowed; and if we as much as breathed a wish to photograph some wayside group, the colonel's aide would arrest and pose those startled individuals with commands that sounded like, "Halt! Eyes right! Stand at ease!" Then our cameras would click, and the aide would report to the colonel, and the colonel would nod, and the aide would shout (or so it seemed), "Company dismissed!"

EAST AND WEST UNITE IN SKOPLJE

Heterogeneous Skoplje! On one bank of the Vardar it struggles to be European, while on the other bank it remains Asiatic—without a struggle. On the one hand, something resembling a boom town, where marble edifice rears over jerry-built structure. On the other hand, a rambling bazaar quarter, containing in its medieval caravansary, its dilapidated mosques, its street types, its picturesque impermanency of aspect, all the characteristics of some ramshackle town in Asia Minor.

Furthermore, Skoplje rivals Rome in the matter of Roman aqueducts, and it can make the unique boast of having tamed 3,000 gypsies. At the close of the war this wandering inheritance from Turkish times was corralled by a nascent Jugoslavia and talked to paternally. "We'll give you some deserted houses and farms," said the authorities, "on condition that you don't travel." Now, that was rather like asking a fish not to swim. And yet—wonder of wonders—Skoplje's gypsies have "stayed put" ever since.

There they are, on a high, outlying ridge, occupying the typical Serbian cabins which overlook their little farms. You may behold gypsies at the plow, gypsies thatching roofs, gypsies keeping store. And there isn't a caravan in sight.

It wasn't hard to locate Gypsytown. Daylong it advertised itself from afar by a ceaseless pandemonium of screeching flageolets and thud-thudding bass drums. It sounded Cairene, as if every soul in Gypsytown were doing the stomach dance.

"A party? A wedding?" we asked our hotel keeper.

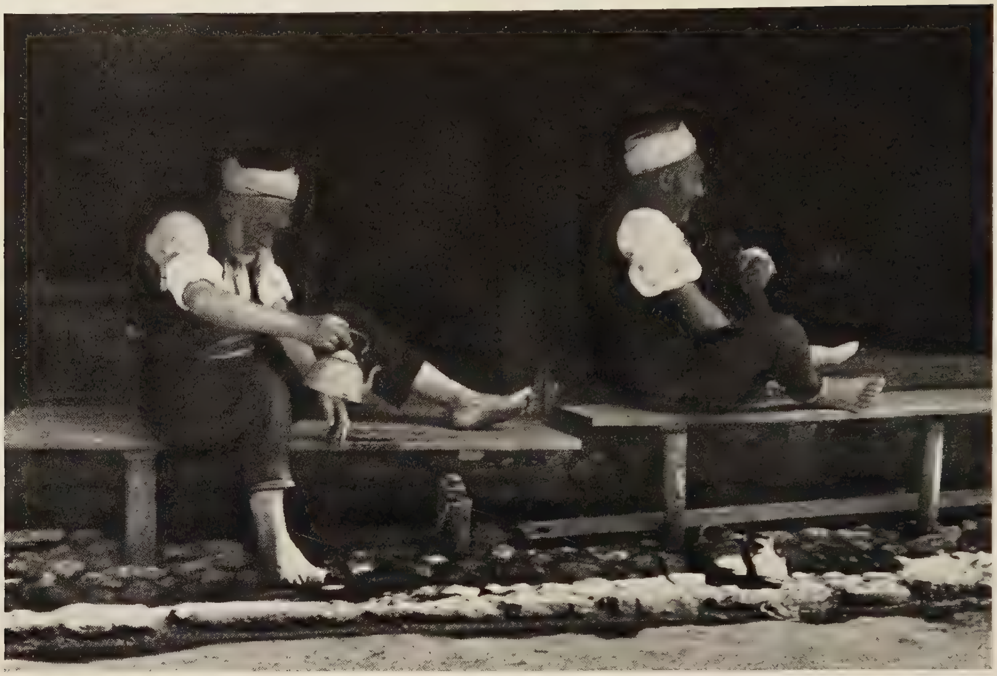
"No," he said. "They just get that way after they've worked steadily for awhile on their farms. You see, they're not allowed to travel, so they take it out in noise." By which we understood that the pandemonium was a kind of Freudian "transference."

We found them—the true, jet-eyed, dark-skinned, semisavage breed that delights in black elflocks and shriekingly colorful garb—seated on their doorsteps at lunch. In fact, they were all out-of-doors; and, though their little homes contained kitchens and tables, they still held to the beloved wayside fire. Yes, they were domiciled, but with a difference. Set the Romany patrin in their ways, and how many of the young ones wouldn't have disappeared on the long trail? As for their wrinkled elders, weren't they at heart like you frustrated, would-be wanderers of Gorgio stock, who "huddle and shut your eyes as the gypsy vans come through?" (see, also, Plates III, V).

MEMORIES OF STEPHEN DUSHAN LINGER ON THE SERBIAN PLAIN

To things pseudo-European, Turkish, Roman, and Romany add variegated Skoplje's evidences of late Byzantine times. In fact, the town is built around the crumbling hill fortress of Serbia's medieval hero, Stephen Dushan. There a parliament codified his laws into "Tsar Dushan's Book." There this champion of Christianity made head against Islam. There he was crowned under the sonorous title of "Emperor of the Greeks, Slavs, and Romans."

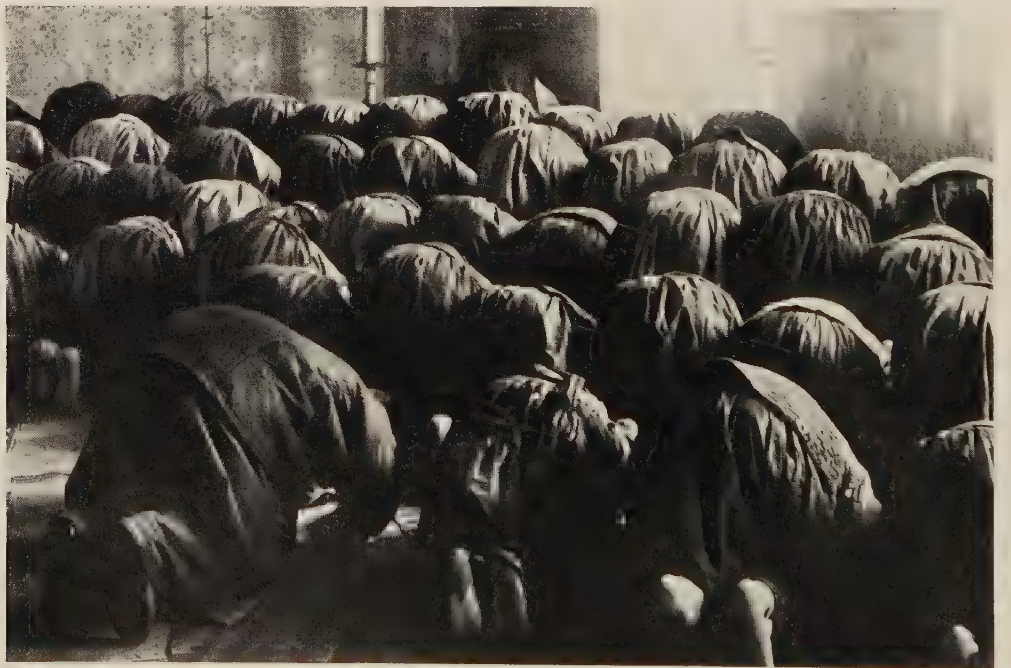
Throughout the Serbian plain the ghosts of Stephen and his Nemanyich ancestors still linger in many a faded fresco that panels the candlelit interior of medieval church or monastery. Priceless relics, these frescoes, of Byzantine art! Tall, slender, spiritualized, the Nemanyich kings and queens, aureoled with gold plaques, peer forth from dim blue backgrounds,



Photograph by Melville Chater

WHEN THE MUEZZIN CALLS, MOSLEM SHOPKEEPERS BEGIN FOOT-WASHING

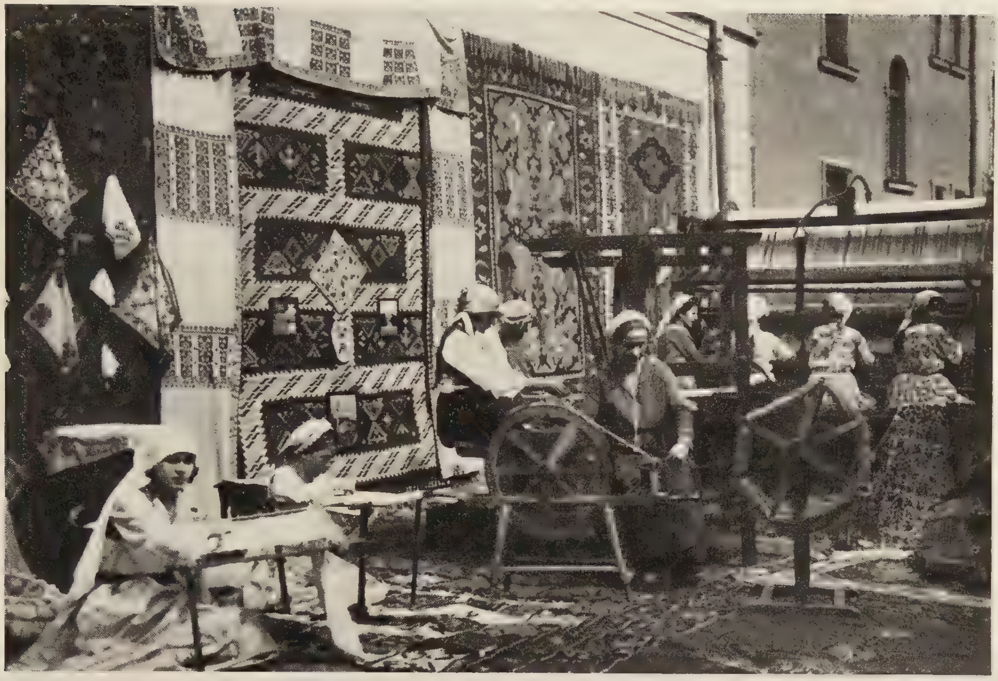
Since running water is required for the rite, the man on the left is about to pour a stream from a teakettle for his ablutions.



Photograph by Rudo Bruner-Dvořák

MOSLEMS PRAYING IN A SARAJEVO MOSQUE

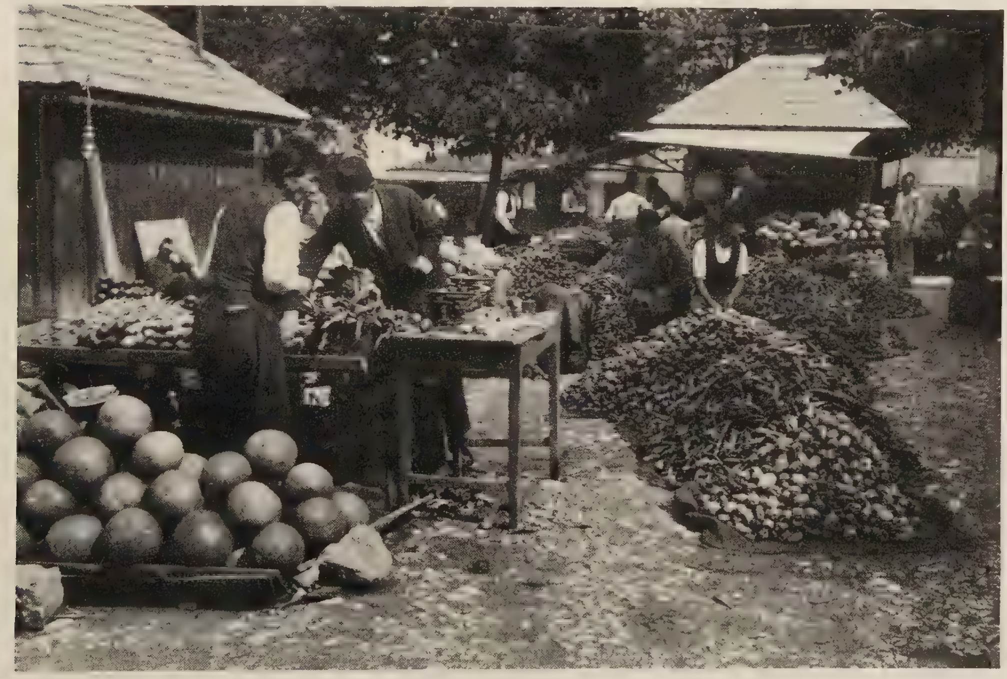
When the Turks invaded Serbia, many Christians yielded to Mohammedanism to escape forfeiture of lands. Descendants of these "converts" are to-day most devout in their adopted faith.



Photograph by Emil Mezer

FINE BOSNIAN AND PERSIAN RUGS ARE WOVEN AT SARAJEVO

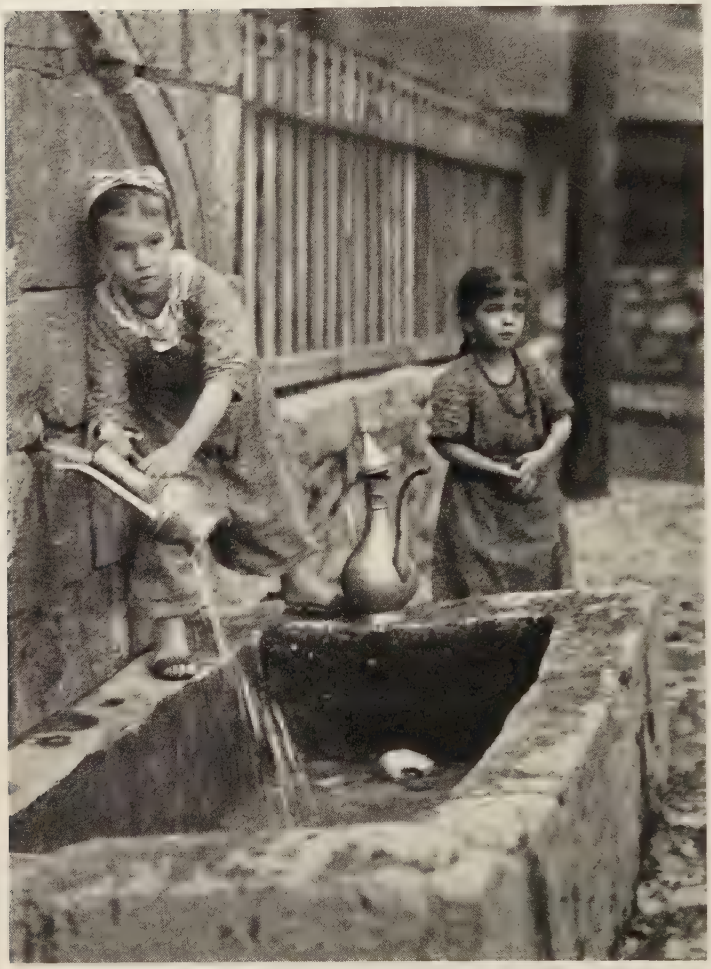
Most of the workers in this factory, which is operated by the Government, are recruited from the Moslem population of the city (see illustration, page 265).



Photograph by Melville Chater

COOL MELONS AND HOT PEPPERS FOR SALE

The latter are as essential to the *lonac,* a popular dish throughout Jugoslavia, as onions to an Irish stew (see text, page 287).



Photograph by Emil Mezer

A FOUNTAIN IN THE OLD PART OF SARAJEVO

The visitor to the Bosnian capital is offered a most interesting variety of scenes. On the main streets he is in the midst of modern Europe, but the moment he steps into a byway he finds himself transported to the Orient. Just around the corner from the fountain from which these Moslem children are filling their Eastern water jugs he may come upon a place purely occidental.

regarding us with their oriental eyes. The queens' coin-strung headdresses and their gowns, inwoven with complex color designs, recall the Serbian peasant woman's adornments of to-day. The fork-bearded kings balance miniature cathedrals on their outstretched palms. Over each regal pair hover angelic hosts tendering scepters and crowns. Yes, Heaven itself was royalty's handmaid in those irretrievable days when kings indeed were kings.

Follow Serbia's sanctuaries northward from Skoplje and you come to the country's most fertile plain. It is the Kosovo Polje, sacred to every Serb as the battlefield where the Nemanyich Empire perished in 1389 (see, also, Color Plate XIV).

Five centuries later that plain, deep in snow, saw the tragic retreat of the Serbian troops and twice as many civilians, in escape from the German and Bulgarian forces' closing shears. Leaving a trail of 10,000 frozen corpses behind it, the half-starved army crossed drifted ranges of Albania and Montenegro, reformed on Corfu, and reëntered action on the Thessalonike (Salonika) front.

We caught the northbound Orient Express. Next morning we beheld distant Beograd (Belgrade) rise like a long peninsula between the meeting waters of the Danube and the Sava.

BEOGRAD HAS "GONE MODERN"

Jugoslavia's metamorphoses, as observed "ten years after," are nowhere more striking than at its capital. Even less than a decade ago Beograd was a semioriental town of low, flat aspect, with wooden pavements and with two-storied houses in the Turkish style. To-day it is preponderatingly a modern city of 340,000 people, having quadrupled its population in 18 years. Intent on westernizing itself with a multiplication of tall buildings, public facilities, smart shopping districts, it suggests the rapid evolution of some American industrial center (see, also, illustrations, pages 286 and 288).

Photograph by Melville Chater

SLOVENIAN LUMBERMEN HAVE CARVED A WATER NYMPH MASCOT FOR THEIR RIVER SHACK

It would be interesting to speculate if, after all, it is not the ladies who most strikingly reveal a city's changing order of life. Beograd has gone flapper, and it is only on market days, with the influx of peasants dressed in age-old styles, that one realizes that he is still in the land of coin-strung headdresses, toe-tilted sandals, and many-hued, ruglike aprons.

Sharply indeed the market-day stroller on Beograd's smart boulevards perceives how very recent is her occidentalization. Down the street come those rainbow-vying peasant women, bent under great yokes from which depend twin firkins of butter and cheese. Some Serbian Jack-of-the-Beanstalk, with his widowed mother's cow for sale, has hitched that animal, with her calf busy at the fount of nourishment, to an electric light standard. As for the threescore little Serbian pigs that went to market, they trot gaily along the sidewalk of that fashionable thoroughfare, in and out among a throng of silk-stockinged legs.

The spectacle of Beograd reconstructing herself is symptomatic of a nationwide process of exchanging old ways for new. Land hunger, that ancient urge which inspired the Southern Slav movement, has been largely solved by abolishing feudal privilege and redistributing feudal estates among half a million Jugoslavian families. Nowadays 140 acres is the maximum amount of land which may be held by an individual not actually cultivating it himself. And thus the Crown's initial proclamation, that "in our free State there can and shall be only free landholders," is well on the way to achievement.

Paralleling agrarian reform, there developed agricultural training schools, social legislation, and a coöperative movement on national lines.

Jugoslavia's coöperatives, with headquarters at Beograd, have become ramified into a vast organization which embraces practically all forms of food production and handcraft existing in the kingdom. Through some 785,000 members and their families, these coöperatives function beneficially for about one-third of the entire population.

Such measures as workers' health and accident insurance, the eight-hour day,

Photograph by Melville Chater

WHERE SAVAGE BATTLES RAGED, A PLEASANT PARK NOW INVITES STROLLERS

Here, at the confluence of the Sava and the Danube, some of the fiercest fighting of the World War took place, for Beograd was a city of great strategic importance. The ancient Serb fortress at the right sturdily withstood bombardments. In the background lies the island of Zemun (see illustration, page 288).

old-age pensions, and child-labor laws have been in operation since 1922-1924. Maternal-welfare legislation forbids the employment of expectant mothers during a period of four months and assures them free medical attention and against loss of work. As for baby, municipal *crèches* await him, and not the least joyous aspect of social legislation is seen at some industrial center like Zagreb (Agram), where, with sand piles, lunches, and games, the city functions *in loco parentis.*

LAURENCE RUNS AFOUL JUGOSLAVIAN LAW

We returned to Sarajevo to face the unpleasant news that our chauffeur had just been arrested. We gained admittance to where Laurence was undergoing head measurement, finger printing, and such like concomitants of crime. Indignantly we demanded of him what he had been doing to provoke arrest.

"Ketchin' me a mess of fish," returned Laurence sulkily.

"In jail for fishing?" chorused four skeptics.

"Yes, sir; jes' fishin' in a mean ole creek," he asseverated.

We sought out the authorities, learned the awful truth, paid Laurence's fine, and made our profound apologies. It would seem that Laurence, like ourselves, had been suffering from that well-known travel complaint, a longing for the dishes of one's own country. In our absence he had visited Ilidža, and while passing the State fish breederies had discovered a stream which he had mistaken as the natural haunt of certain speckled trout. In blithe innocence he had returned with rod and tackle and had whipped the stream to advantage. He had been apprehended with a fine string of Government trout in his possession, and arrest had followed.

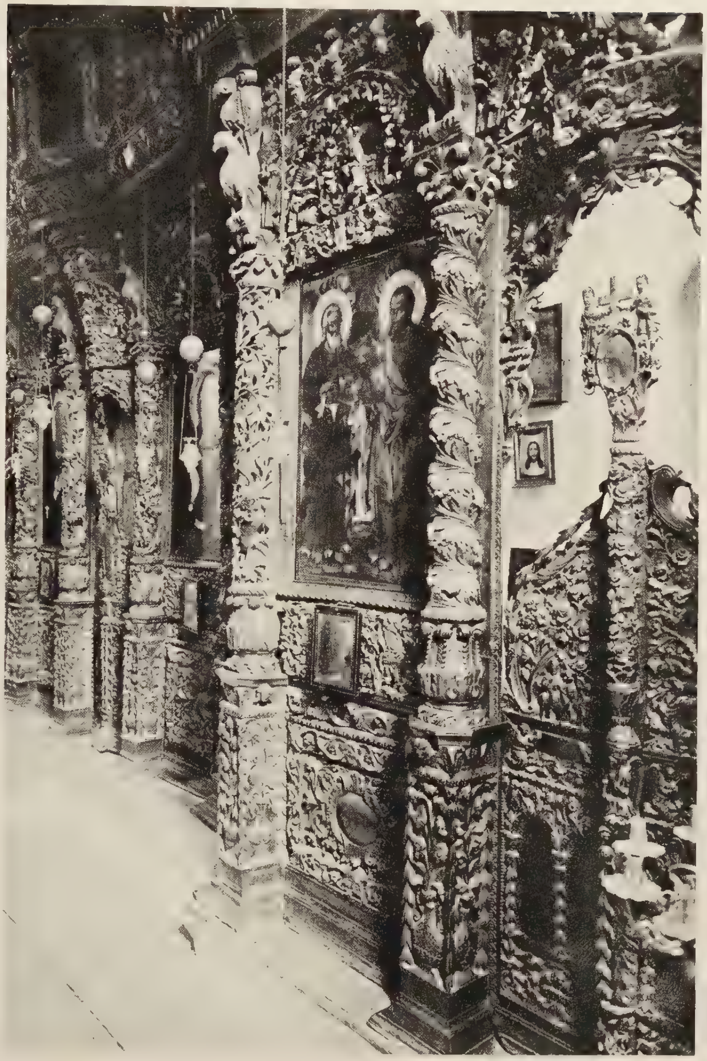
We got Laurence out of jail, then berated him for his stupidity in fishing on Government preserves, but he couldn't believe his ears. "Gov'ment *fish!"* he kept muttering to himself. "Dis ain't no free man's country. Never did heah yit of Gov'ment *fish!*"

A GLIMPSE OF A BOSNIAN FARMHOUSE

From Sarajevo we headed for Zagreb via the Plitvička Lakes. Now the rain-washed skies reappeared, a delicate blue overarching springlike pastorals throughout that green, undulating countryside of flocks, white cattle, picturesque peasantry.

Here was the simple Bosnian farmhouse—shingled, weather stained, chimneyless save for a roof vent—shaped like the house a child builds out of eight playing cards. Simple, too, its earth-floored bare-walled interior, with drying vegetables hung from the ceiling and the invariable hand loom in the corner. Venerable ancestor of the weaving mill, busily it click-clacks through long winter evenings, turning out clothing fabrics of intricate color design. Of wall paper, rugs, hangings, the Bosnian farm couple has no need. Gaily becostumed, they are themselves their own "interior decoration" (see, also, page 292).

Indeed, they are almost independent of the outside world. To supplement such home products as corn bread, garden truck, cheese, the butterlike *kaimak,* and Bosnia's inevitable peppers, they occasionally jaunt by oxcart for maybe twenty miles to some village store, where they purchase coffee, rice, and kerosene. Meat is confined to Sundays and holidays, when a barbecue takes place amid endless treading of the circle dance, performed to gypsy music.



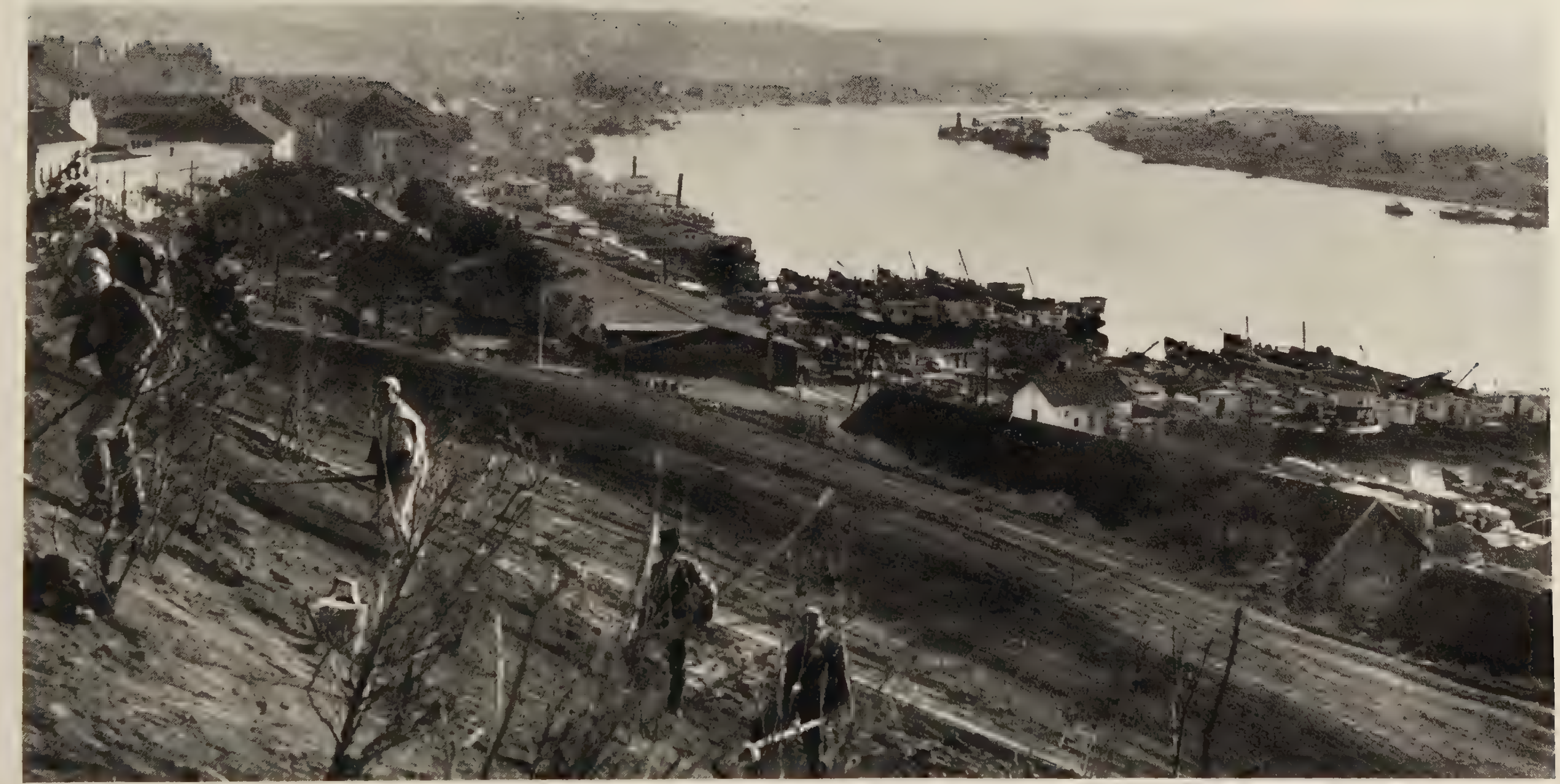
Photograph from Melville Chater

WOOD CARVING LENDS MEDIEVAL CHARM TO THE CHURCH AT SKOPLJE

The building is little more than a century old, but the decorations give it the appearance of antiquity.

THROUGH FORESTED HILLS TO THE ANCIENT SEAT OF BOSNIA'S KINGS

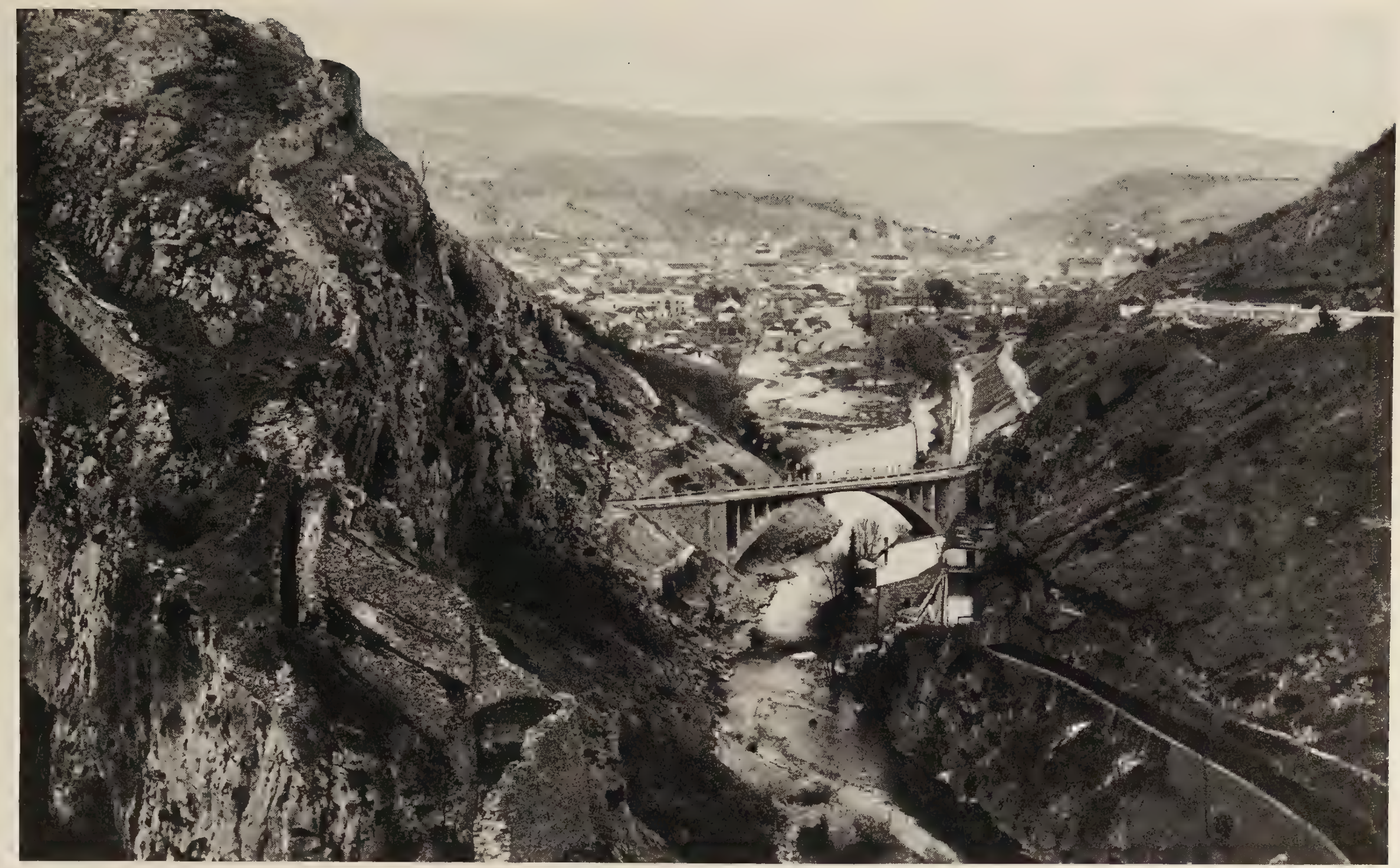
As for us, often dependent on village fare, we soon wearied of the ever-present *lonac,* which may be described as an Irish stew with a Slav education; and often we would catch Laurence's eye roving toward wayside hencoops in pursuit of his expressed aim to "get him a chicken" and



Photograph by Melville Chater

THREE TIMES DURING THE WORLD WAR HEAVY BOMBARDMENTS BATTERED BEOGRAD DOCKS

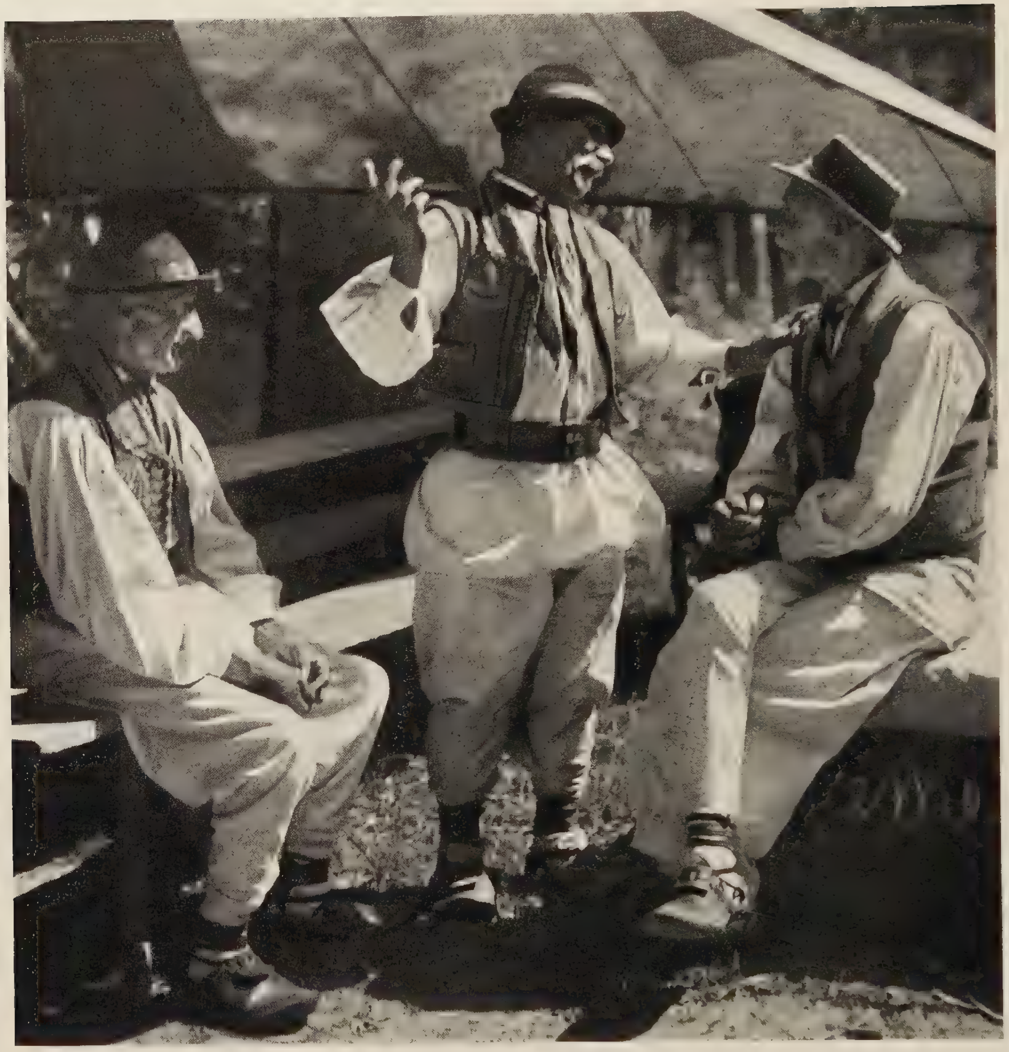
Shells flung across the Danube from the Austrian guns at Zemun, in the right background, tore the slope where these peasants are working. Courage and enterprise have removed most of the traces of the conflict.



Photograph from Melville Chater

WILD AND CRAGGY HILLS SURROUND UŽICE

Railroad building through this part of Jugoslavia presents problems of great difficulty. The town is connected with the main line between Beograd and Thessalonike (Salonika). The route from here to Sarajevo, to the west, is a triumph of engineering.



Photograph by Hans Hildenbrand

SETTLING THE AFFAIRS OF THE JUGOSLAV NATION

Wherever a few men come together, a spirited argument is sure to be carried on, for Jugoslavia represents a mingling of many racial groups. These three wear the typical summer clothing of their Croatian village. In winter they will put on heavy sheepskin coats over their embroidered waistcoats.

prepare it according to the ways of his native State, which is Maryland.

We climbed into a higher region of pine-clad hills, down which long chutes bore logs from distant camps to the brink of the gray-green Pliva. Winding along its sinuous course, we came to little hill-nestling Jajce, where the river gathers into falls that drop foamily into the rushing Vrbas.

Jajce, where Moslem minarets rise against the background of its ancient fortress remains, was of old the seat of Bosnia's kings. Enthroned among mountains and headwaters, they surveyed scenes of valley, gorge, and forest that still preserve a wild aspect as of centuries ago. A noble realm it was, made for hawking, hunting, and castle banquets. We agreed that it wouldn't have been half bad to week-end with the kings of Bosnia's tapestried past.

We entered the Tjesno Gorge, driving for four hours where the Vrbas's waters crested as rapids or subsided into trout pools, with always the canyon's gnarled

Photograph by Clara E. Sipprell

CROATIAN PEASANTS IN THE ZAGREB MARKET

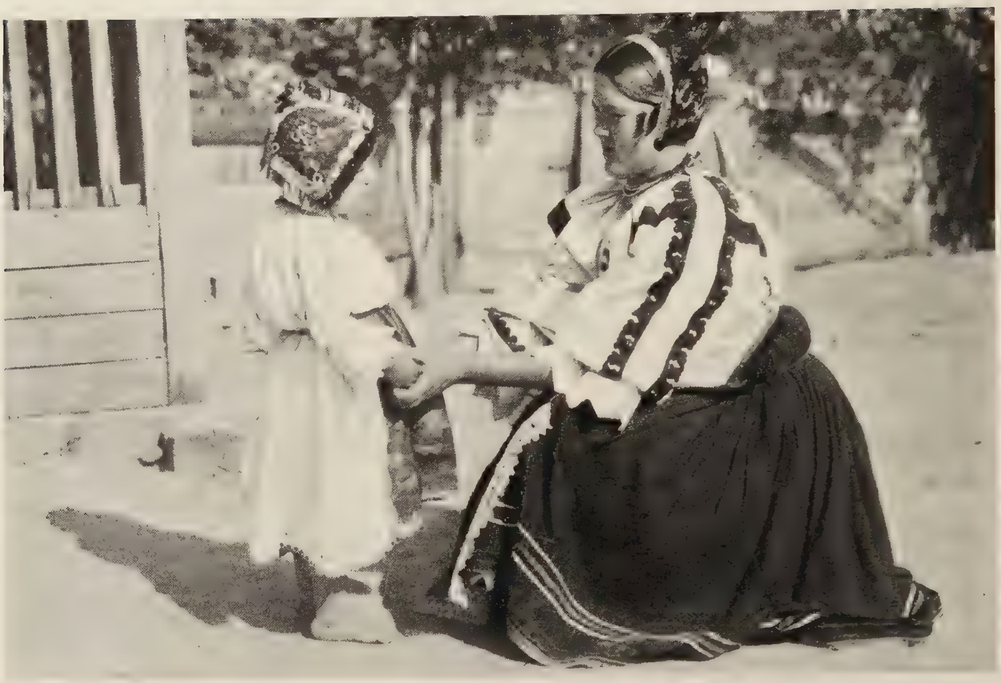
Although the city is growing rapidly and has all the modern smartness of populous centers elsewhere in Europe, some of the country folk still wear the national costume and barter their produce in the streets as did their ancestors.

sides looming above us, magnificently wooded to the river's brink. Here, as elsewhere, Bosnia's enduring charm lies in its sheer wildness of woodland and watercourse. Often one has to remind oneself that he is not traveling in some virgin country, but in one which has known settlement and conquest since the days of the ancient Thracians.

Emerging from the gorge, we came to a pretty, Turkishlike town of garden-surrounded houses, Banjaluka. Some smattering of philology caused us to suspect that the Slavic "banja" and the Italian "bagni" meant the same delightful thing—natural baths, where four travelers, long tubless, could luxuriate in thermal waters.

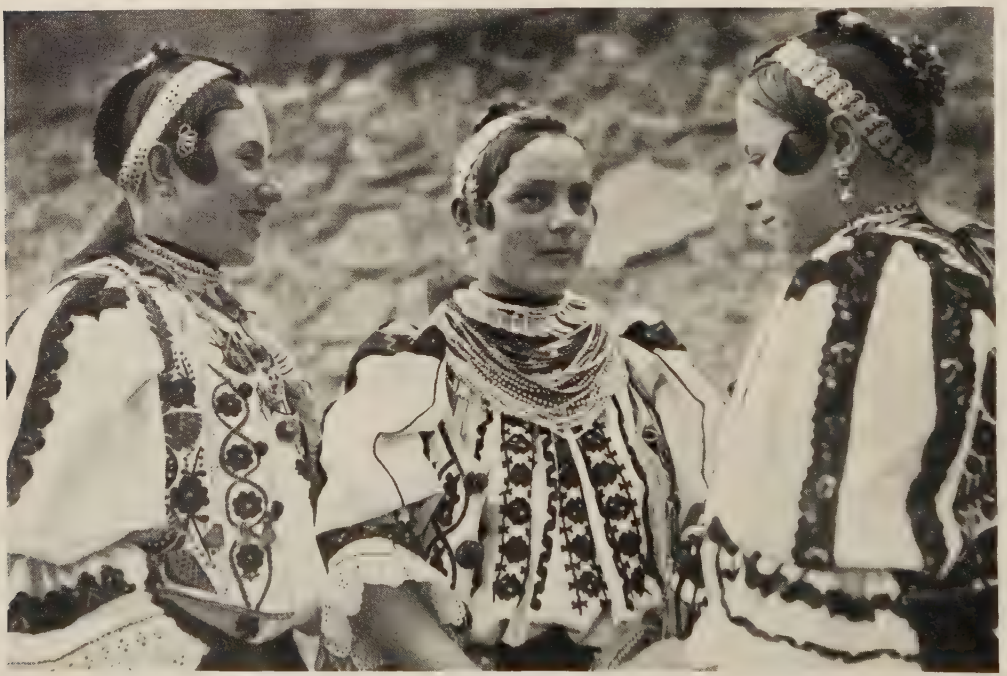
We questioned our hotel proprietor. He said: "Baths? I should say so. Very famous. Everybody visits them. Just follow along the river for two miles."

We prepared for this rare treat by furnishing ourselves with dressing gowns, sponges, rough towels, and some one even brought along a bottle of bath salts. Then we drove for the specified two miles and looked about us. Not a sign of a bathhouse! Nevertheless we kept on ques-



THE SOUTHERN SLAV MOTHER WEAVES HER OWN AND HER BABY'S CLOTHING

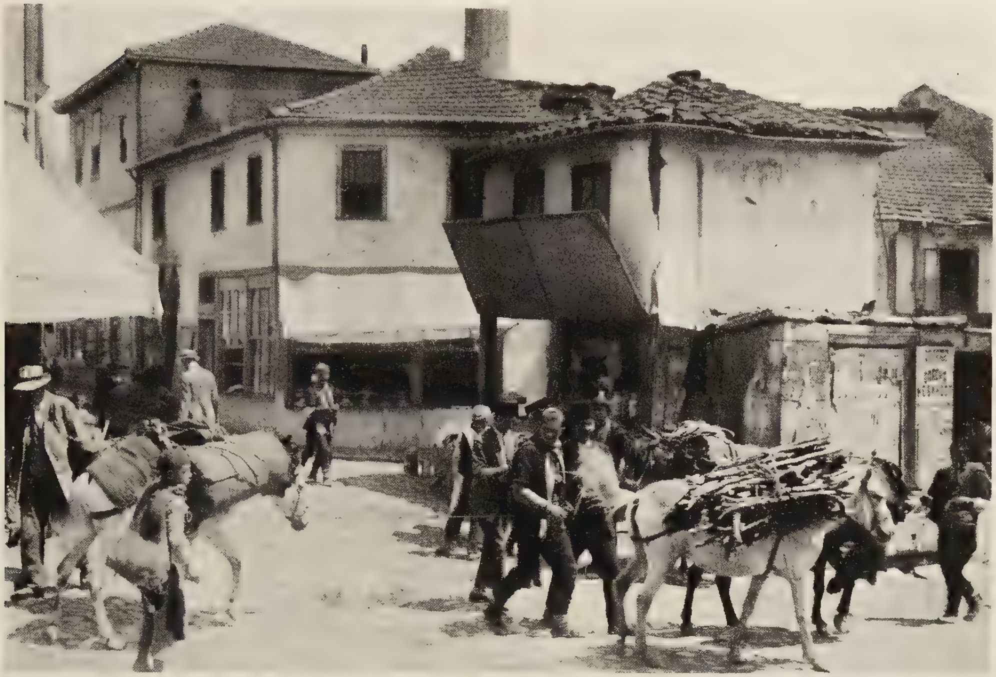
Weaving, embroidery, and linen manufacture are practiced by all of the women of the prosperous families of the Sava River region.



Photographs © Hungarian Press-Photographic Exchange

ODD COIFFURES AND RICH COSTUMES MARK CROATIAN WOMEN

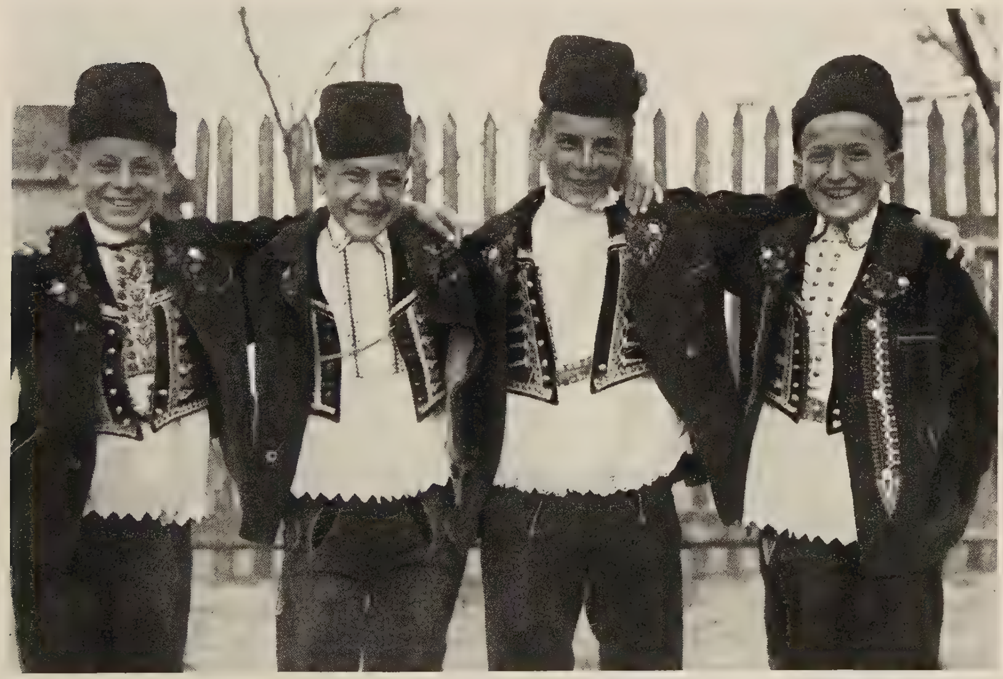
Needlework is far from a lost art among housewives of the prosperous families along the Drava River. Though well able to afford the best of modern dress, they continue to make their own strikingly individual clothing (see, also, Color Plate XV).



Photograph by Hans Hildenbrand

VENDERS BRING FAGOTS FROM THE HILLS TO SELL IN PRIZREN

Mules are the only available pack animals capable of scrambling through the rough country where the wood is cut.



© Hungarian Press-Photographic Exchange

CROATIAN BOYS CAN SMILE DESPITE "SUNDAY CLOTHES"

Embroidered shirts and jackets, white stockings, and yellow slippers or decorated boots make their costumes strikingly colorful, but the sheepskin caps, worn the year round, seem a bit warm for summer.

Photograph by Fr. Pavlin

SHEEP GRAZING IN THE JULIAN ALPS OF SLOVENIA

Photograph by Melville Chater

LIKE DIOGENES IN HIS TUB, THE SWABBER LIVES IN CASKS

His job during the grape-pressing season is to clean the containers in preparation for the new wine. He is crawling out of a hole in the head of a barrel which he has finished scrubbing.

SLOVENIAN FARMERS DRY MAIZE ON RACKS BUILT AGAINST THEIR BARNS

Photograph by Alice Schalek

LOVELY FALLS LINK A SCORE OF MOUNTAIN LAKES NEAR ZAGREB

Some of the finest natural scenery in Jugoslavia is found here, where the clear waters from the Plitvička chain of pools leap down from level to level in dashing cataracts (see page 296).

tioning passers-by until at last an old peasant indicated that he knew the way and would guide us. Bearing our impedimenta, joyously we followed him. Presently he pointed to some remains of ancient masonry and therewith began to pantomime face washing.

We investigated those venerable but quite waterless ruins. Had they contained as much as a stagnant puddle we might have been tempted, especially the fellow who brought bath salts along, to drown that miserable old man. And yet they *were* baths; any archeologist would have agreed with him. The only drawback was that they were Roman baths and hadn't been in working order for some two thousand years.

CROSS AND CRESCENT ABIDE TOGETHER PEACEABLY AT BIHAĆ

Next day we came to Bihać, where Moslem minarets and Christian spires rose side by side over the rushing river. Like many a Jugoslavian town of mixed religious elements, Bihać, with its well-cultivated gardens and neat homes, exemplifies how readily Christian-Moslem communities will, if left to themselves, flourish and fraternize.

This fraternalism was abundantly marked along our route from Bihać to the lakes.

We climbed through such beautiful woods of white birch and evergreens as commonly prelude Canadian lake regions. Then from a summit we beheld a chain of woodland-bordered, disklike expanses whose waters descended by cataracts from one lake into another (see page 295).

The Plitvička Lakes reveal Nature in a mood for producing lovely miniatures. Here she has created sixteen of them with, one might say, meticulous regard for just the right colors, backgrounds, and cliff contours; or, to change the simile, she fashioned a necklace of aquamarines, each one varying in shade from the other, then flung its outstretched links between the bases of green-bowered hills.

Some lakes were destined to bear the canoes and inherit the names of great explorers. Smaller ones have proved their appropriateness for summer colonies and motor-boat racing. The yet-smaller Plitvička Lakes remain, in their remote serenity, a natural sanctuary, where poets of some "lake school" might gather and where water nymphs—classic ones, not those of the one-piece-suit kind—might gambol under the moonlight.

I may add, lest water nymphs be considered out of fashion, that we encountered one. It was a few days' journey beyond the Plitvička chain. She was carved of wood, almost to human scale—twin tails and flowing ringlets complete—and she adorned the gable of a storage shed for logs that floated down the adjacent stream. She was a genuine undine that some log-jammer had set up in propitiation of local water sprites (see page 285).

It was somewhere between the lakes and Zagreb that we stopped to inspect one of a score of agricultural training schools that are dotted over Jugoslavia. Issuing from the classrooms, we traversed neatly planted truck plots, including a patch of big, luscious-looking watermelons. Laurence lingered behind on that melon patch in such a suspicious way that we hailed him to come on.

Catching up with us, he said with a fine implication of emphasis, "I was goin' to *buy* one."

"You can't," we told him. "They're Government watermelons."

And as we drove off we heard him mumbling to himself, "Never did heah of Gov'ment watermelons! Gimme a free man's country!"

A fleeting glimpse of Karlovac and its factories revealed that we had left primitive Bosnia and were crossing industrial Croatia—a province which contains some of the kingdom's busiest manufacturing centers.

Jugoslavia's key industries, based on timber, chemicals, iron, and sugar beet, are retarded by her lack of fuel. Costly importations of coal must supplement her inadequate output of 4,000,000 tons a year. The Arabian wizard's cry of "New lamps for old!" proved no less magical a phrase than "White coal for black!" will prove, once Jugoslavia harnesses her fast-flowing rivers (see, also, text, page 264).

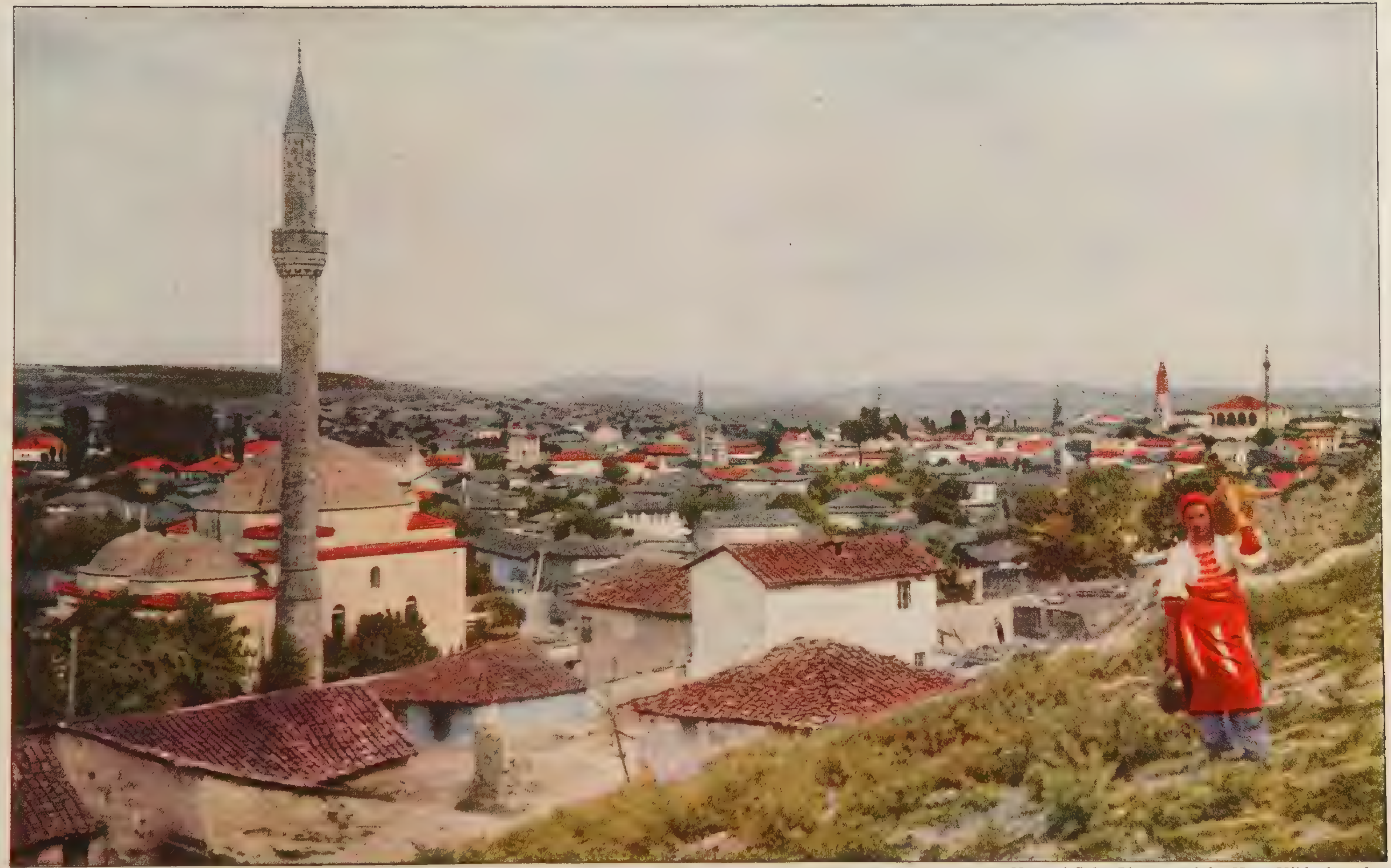
INDUSTRY AND PROGRESS MARCH HAND IN HAND

The output of the above-named industries, together with live stock, cereals, bauxite, and cement, form Jugoslavia's exports. Her imports consist chiefly of

© National Geographic Society Natural-Color Photograph by Wilhelm Tobien

A PATRIARCH OF KOTOR (CATTARO) ENJOYS THE PEACE OF HIS ARBOR

The port of entry to the Montenegrin section of Jugoslavia has unusual possibilities as a commercial or naval base if railway connection is established with the cities of the interior. Its sturdy inhabitants are passionately devoted to their rooftrees.

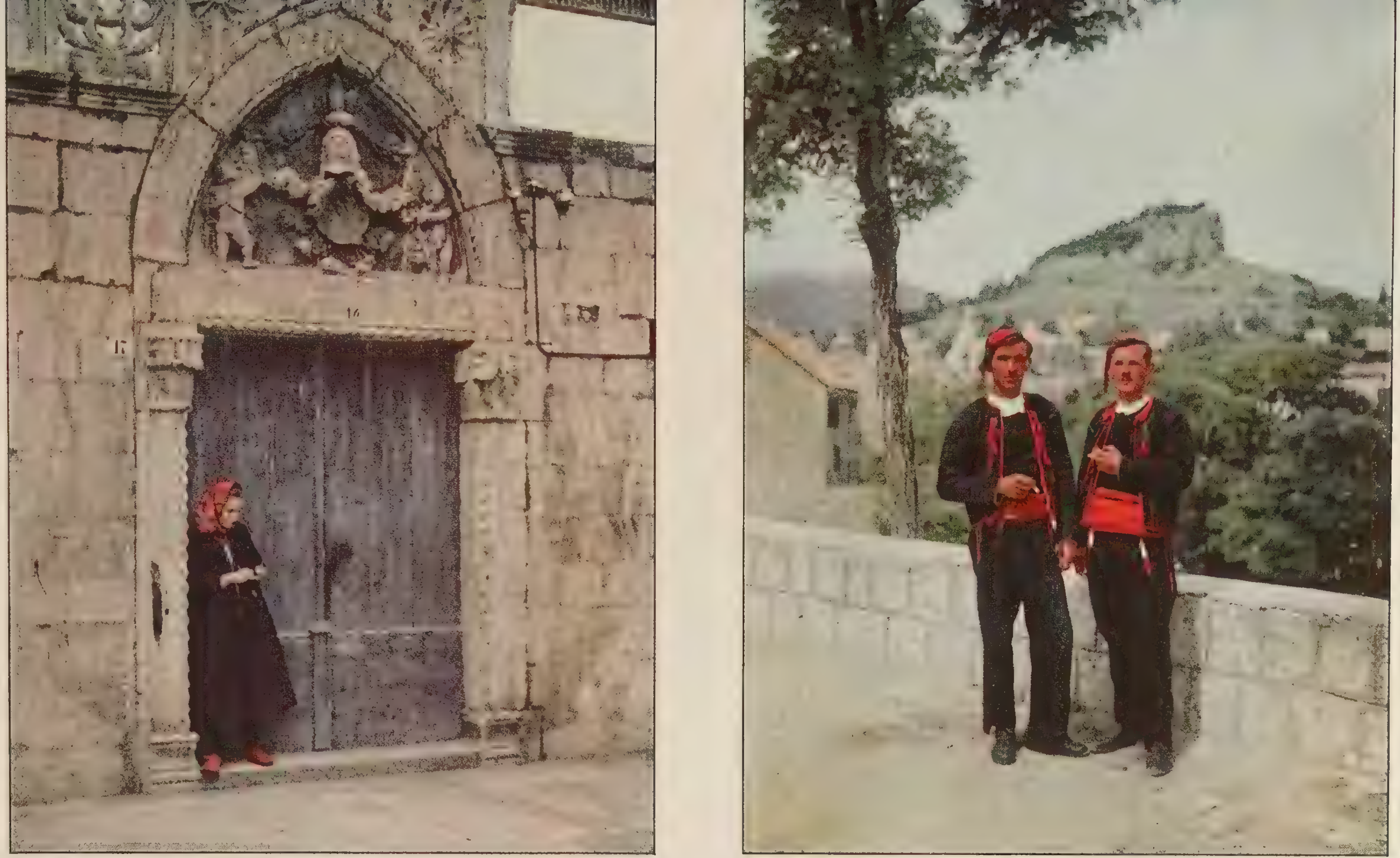


© National Geographic Society

Natural-Color Photograph by Hans Hildenbrand

NUMEROUS SLENDER MINARETS ATTEST A LARGE MOHAMMEDAN POPULATION AT SKOPLJE

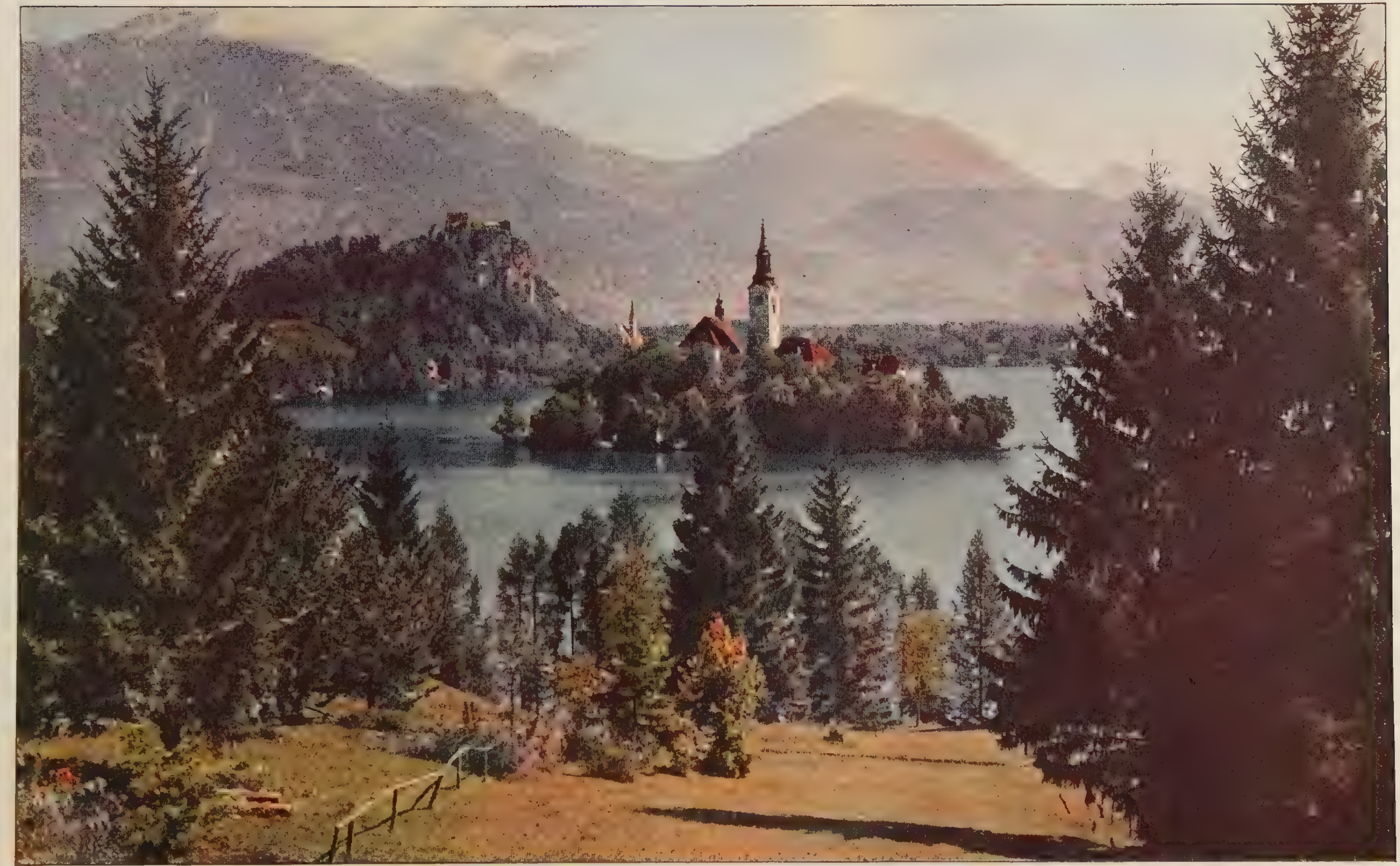
Despite its importance as the commercial and distributing center of south Serbia, this city is not as modern as some of the other large communities in Jugoslavia. However, it is alive to its needs and has projected, among other municipal improvements, an up-to-date electric power plant. The 50,000 inhabitants, many of whom are Moslems, get their water supply entirely from springs and wells (see also Color Plate IV).



Natural-Color Photograph by Wilhelm Tobien　　© National Geographic Society　　Natural-Color Photograph by Hans Hildenbrand

ROMANCE AND HISTORY CLING TO THE FAIR DALMATIAN COAST

Successively under the rule of Venice, France and Austria in recent centuries, the western shores of the Adriatic, a region where East meets West, are now among the fairest possessions of the new kingdom of Jugoslavia. The old doorway at Rab (left) once gave entrance to a Venetian palace. The two young men are from the vicinity of Split (Spalato), a coast town between Zara and Dubrovnik.

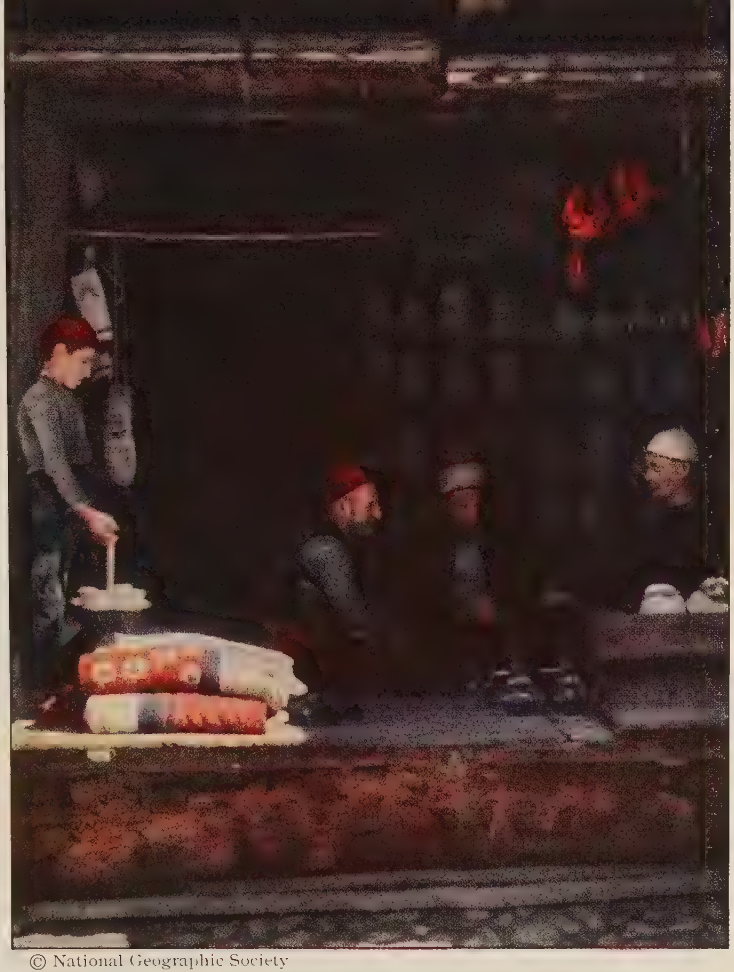


© National Geographic Society

Natural-Color Photograph by Hans Hildenbrand

THE ISLE IN ALP-GIRT LAKE BLED MIGHT WELL BE THE SCENE OF A FAIRY TALE

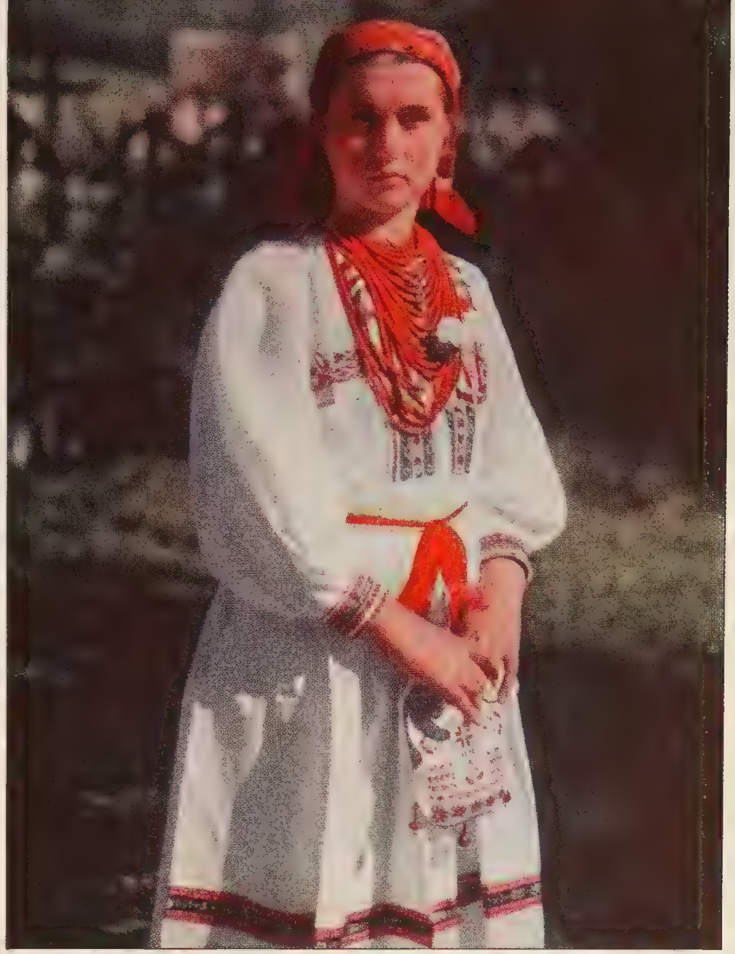
Time has wrought little change in the valleys, mountains and lake shores of Kraniska (Carniola), and although it is a favorite summering place, it has not lost its idyllic charm.



© National Geographic Society

BUSINESS DOESN'T TAKE ITSELF TOO SERIOUSLY HERE

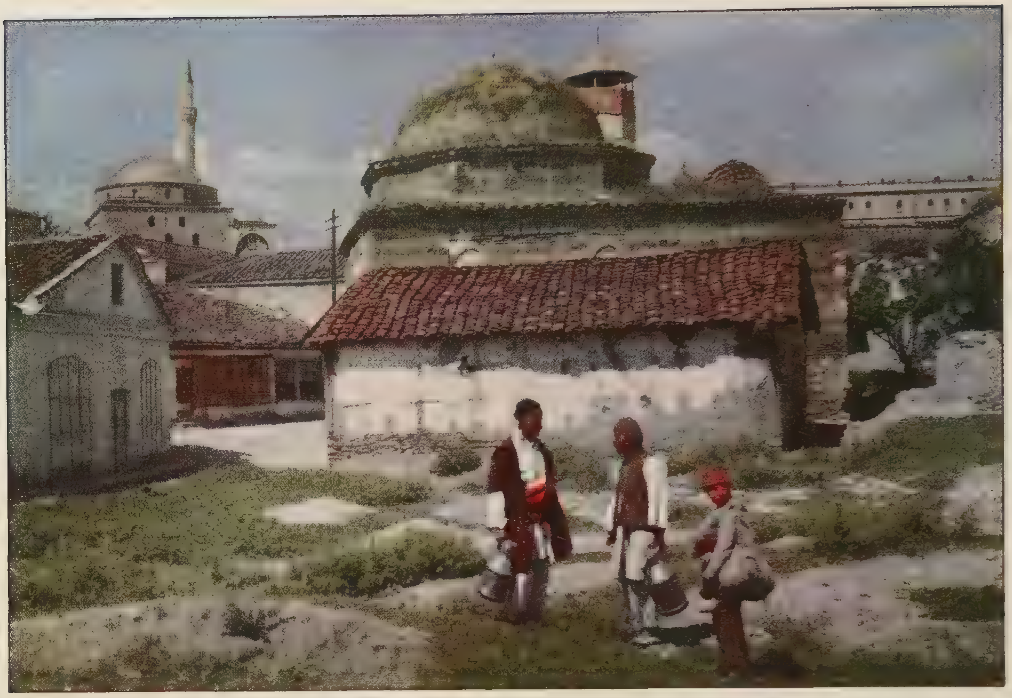
During the drowsy afternoon hours commercial activities lull and boys from near-by cafés carry around trays laden with small cups of coffee to serve their regular patrons. Fez merchants of Priština.



Natural-Color Photographs by Hans Hildenbrand

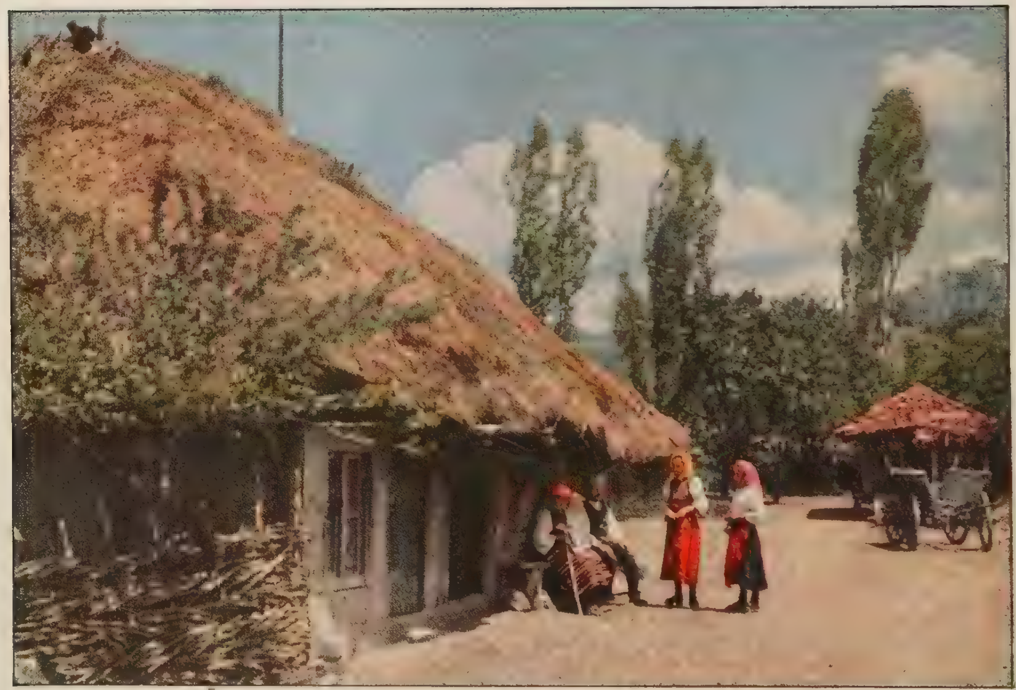
SLOVENE WOMEN CREATE THEIR OWN ADORNMENT

Exquisite hand embroidery embellishes the apparel of young and old, and the fame of their work has spread until it is now eagerly sought after in the fashion centers of the world.



TREASURES OF ART LIE HIDDEN IN SKOPLJE'S DINGY TURKISH QUARTER

Priceless rugs, tapestries and weapons adorn some of the old houses of once powerful Turkish citizens.

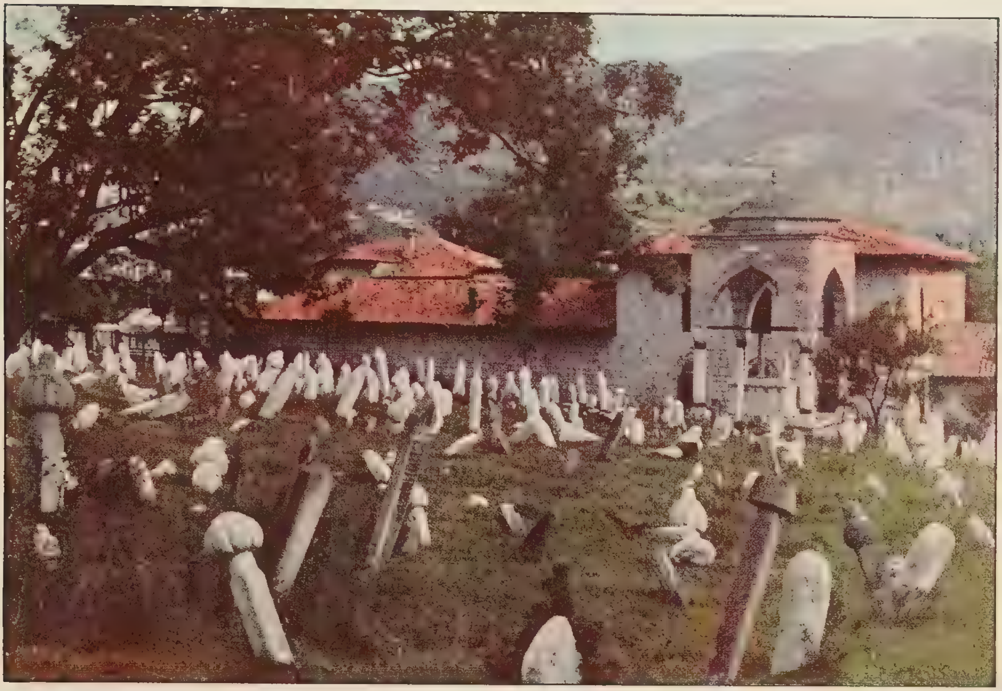


© National Geographic Society

Natural-Color Photographs by Hans Hildenbrand

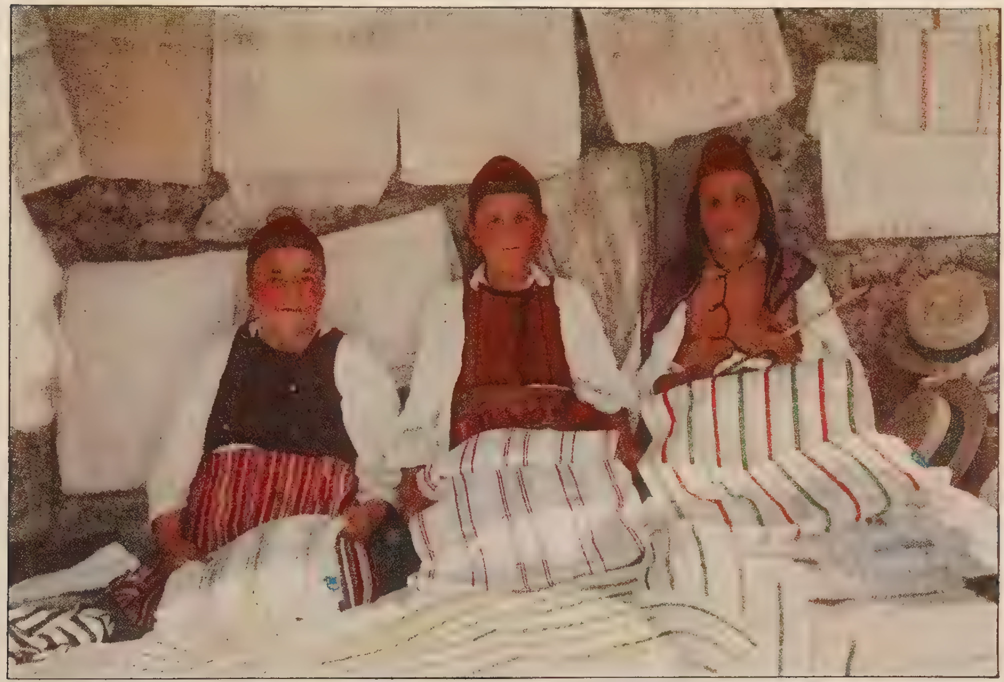
SACRED MEMORIES HALLOW THE PLAIN OF KOSOVO

This old style peasant dwelling is located on the field where, in 1389, at the Battle of Kosovo, Turks led by Sultan Murad I crushingly defeated the Serbs under Tsar Lazar. Both leaders were killed, the Sultan by a Serbian patriot's dagger, and the Tsar, a prisoner, by the executioner's sword.



MOSLEM GRAVEYARDS STAND IN THE PATH OF PROGRESS

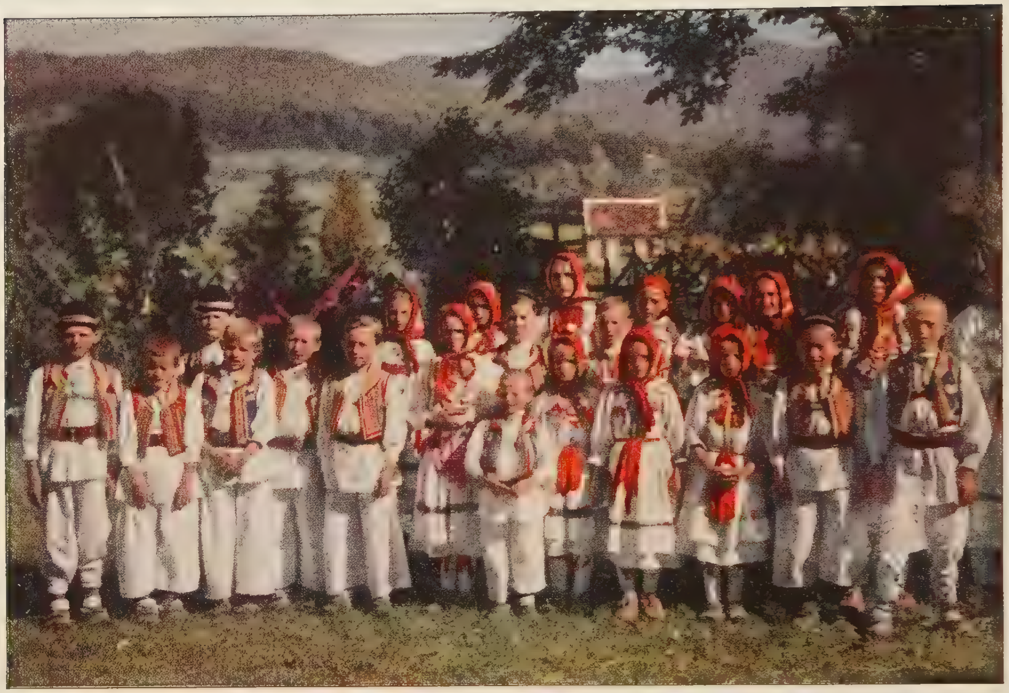
To a Mohammedan, the last resting place of one of the faithful is a sacred spot which must not be disturbed.



© National Geographic Society Natural-Color Photographs by Hans Hildenbrand

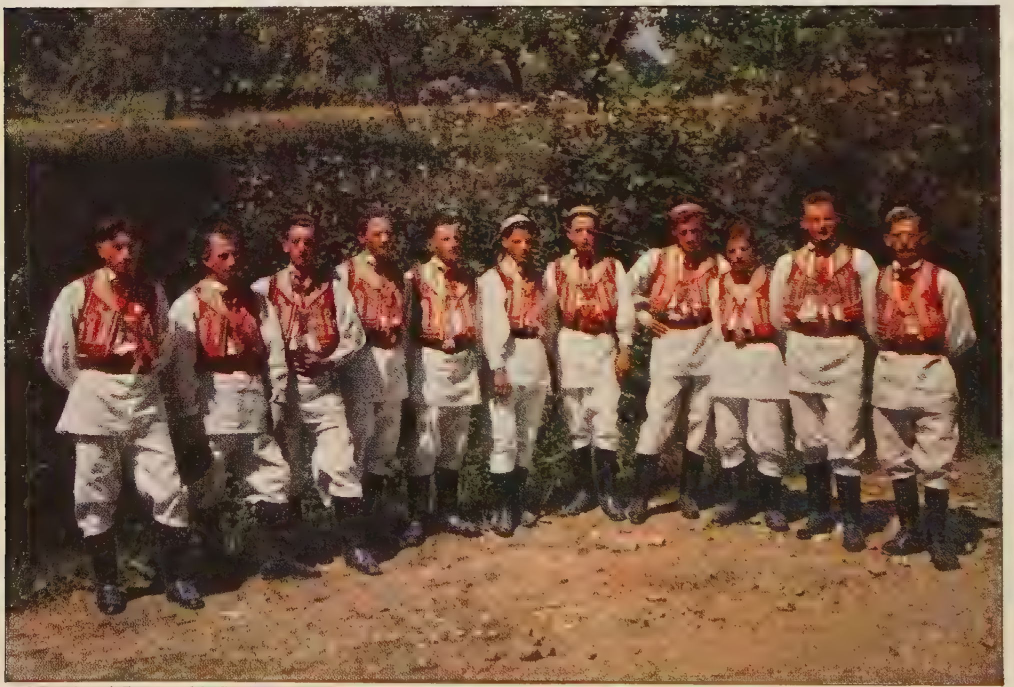
JUGOSLAV MATRONS TAKE PRIDE IN THEIR HANDWOVEN FABRICS

Linens, woolens, and cotton cloth are made in the homes of peasant women. Housekeeping here is not numbered among the lost arts and the "homemade" label is found on so many articles of family use that it actually serves as a deterrent to the industrial development of the Nation.



SCHOOL IS NOT A NEW EXPERIENCE FOR CHILDREN OF CROATIA

Before the formation of the present Jugoslav State the Croats were under the rule of Austria and were allowed some educational privileges. These peasant children are from the vicinity of Zagreb (Agram).



© National Geographic Society

Natural-Color Photographs by Hans Hildenbrand

ON YOUTHS LIKE THESE JUGOSLAVIA RELIES FOR PROGRESS

The older generation is loath to change its ways, but young men, trained in scientific methods, will develop the best their land affords. Croatian peasant boys.

raw materials for her textile and other industries, to which purchases the United States contributes 4 per cent.

Zagreb, Croatia's capital, ranks among the foremost of Jugoslavia's industrial centers. The spirit of progressiveness speaks in its fine public buildings, its handsome squares, its humming activity, its frank determination to keep Croatia prominent on the commercial and political map.

The last-named characteristic runs true to form with Zagreb's history. Its civic annals began in the thirteenth century, when it was created "a free town of the king" in acknowledgment of its defense against the Tatars. Two centuries later the Turks advanced against Zagreb, but with no better luck. In the nineteenth century it centered Croatia's movement directed against the Hapsburgs' attempted Teutonization of the country. And so it is not without significance that there stands in Zagreb the statue of that Slavonian priest who became, as Bishop Strossmayer, the father of the Jugoslav national movement.

One might multiply proofs that that movement has amply justified itself. Yet Jugoslavia still has her problems, extraterritorial as well as internal. Into her melting pot have gone three peoples, Slavic in tongue yet differing in culture—differences which still express themselves in the form of sectionalism. But, with Jugoslavia's already substantial progress in evidence, few can doubt that she will achieve unification.

Zagreb consists of a once-fortified hill town and, beneath it, a modern complex of commerce. The turmoil dies away as you ascend hillward over a winding street that enters as curious a portal as ever divided a city's bustling present from its mellow past. It is the vaulted shell of what was anciently part of a castle and is now a street shrine. Through its dimness glows a starlike galaxy of altar candles, revealing icons and bowed worshipers, as among a press of footfarers you pass in at its one archway, then regain daylight through its other.

Beyond, all is muted peacefulness. There is not a street car, scarcely a shop front, to mar the etchinglike scene of St. Mark's Square, with its Gothic church, palaces, and Town Hall—a scene which for centuries has witnessed the determining of Croatia's destinies. Then, issuing from the square, you find yourself on a tree-vistaed promenade, from which vantage point among the upper town's past you survey the panorama of the lower town's busy present.

Descend into that present and you can scarcely miss finding yourself among one of the most picturesque market scenes in Europe. It is that of the great Jelačić Square, ranged from end to end with planks on trestles, with every kind of farm product heaping the planks, with festally costumed Croatian women at each stall, and with a milling mass of basket-carrying housewives—a cash-and-carry spectacle involving a thousand or so participants (see pages 291, 309).

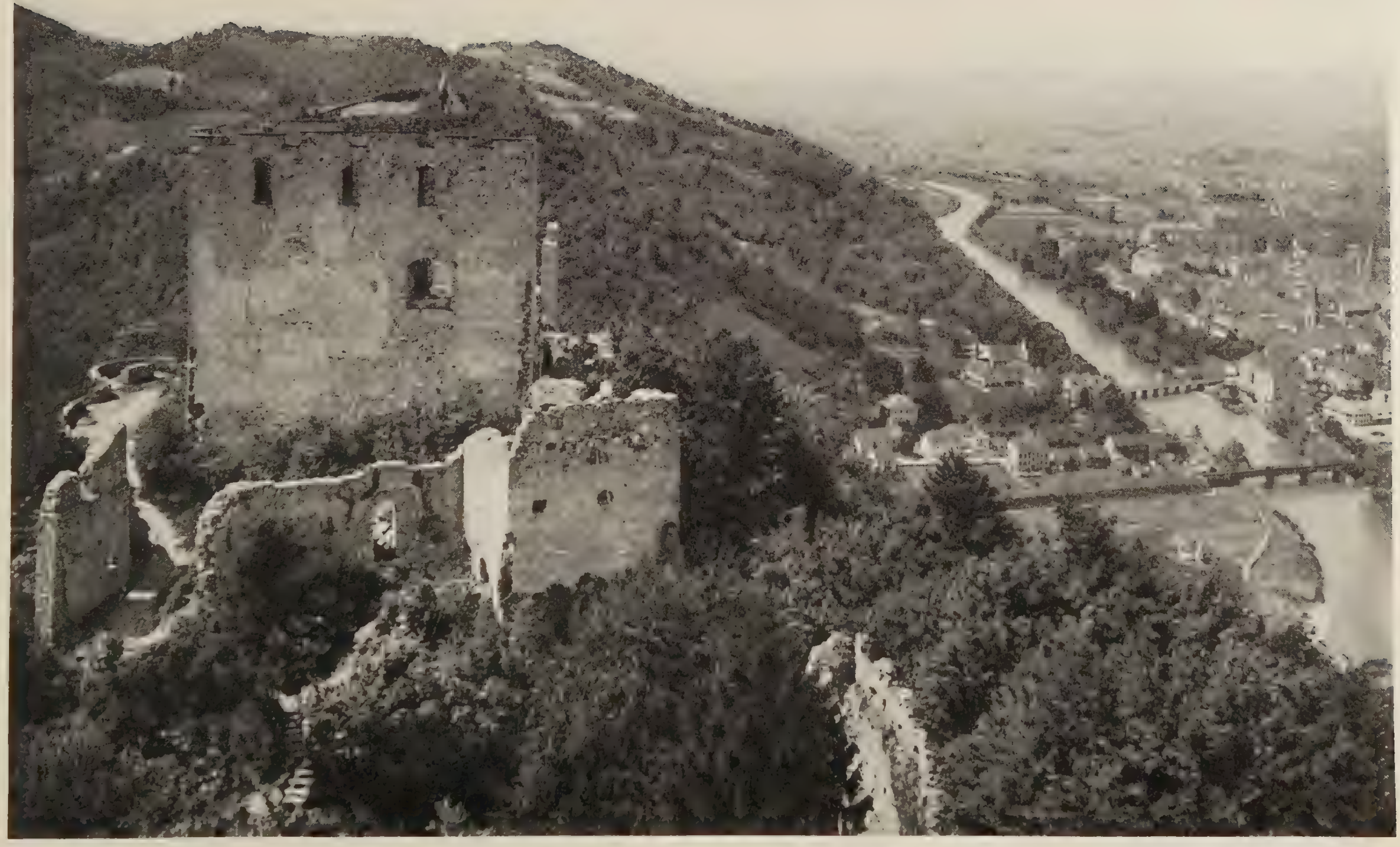
ZAGREB'S MARKET A RESPLENDENT SIGHT

A market is just a market, but Zagreb's more nearly resembles a civic fête, performed in fancy costume and supervised by a skilled stage director. Each of the hundreds of Croatian stall women is adorned in gorgeous, hand-woven raiment, including short skirts and white stockings on plump legs, whose calves are encircled by coquettish, cherry-colored bows.

Why these early-rising, produce-toting peasants from outlying farms thus begay themselves daily as for a festival remains for sober-clothed Westerners a mystery, for this gala sight is staged every day of the year. At dawn municipal employees set up the stalls. For six hours the spectacle goes on. Then at noon, as if a wand had been waved, everything—stalls, produce, costumed peasants—melts away. The square changes like a stage denuded of scenery and the rapt onlooker wakes as from illusionment.

THROUGH "BEER IN THE BUD" COUNTRY

From Zagreb we circled through Slovenia, that lovely, sub-Alpine province of a remarkably diversified kingdom. Now we penetrated a region of trellises laden with luxuriant vines, whose aroma revealed that we were in a hop country—"beer in the bud." Now hops gave way to orchards and vineyards, and these to newly furrowed fields, strikingly black among Slovenia's bright-green pastures; and always the air grew keener, and the multitudinous streams sang more shrilly



Photograph by Atelje "Pelikan"

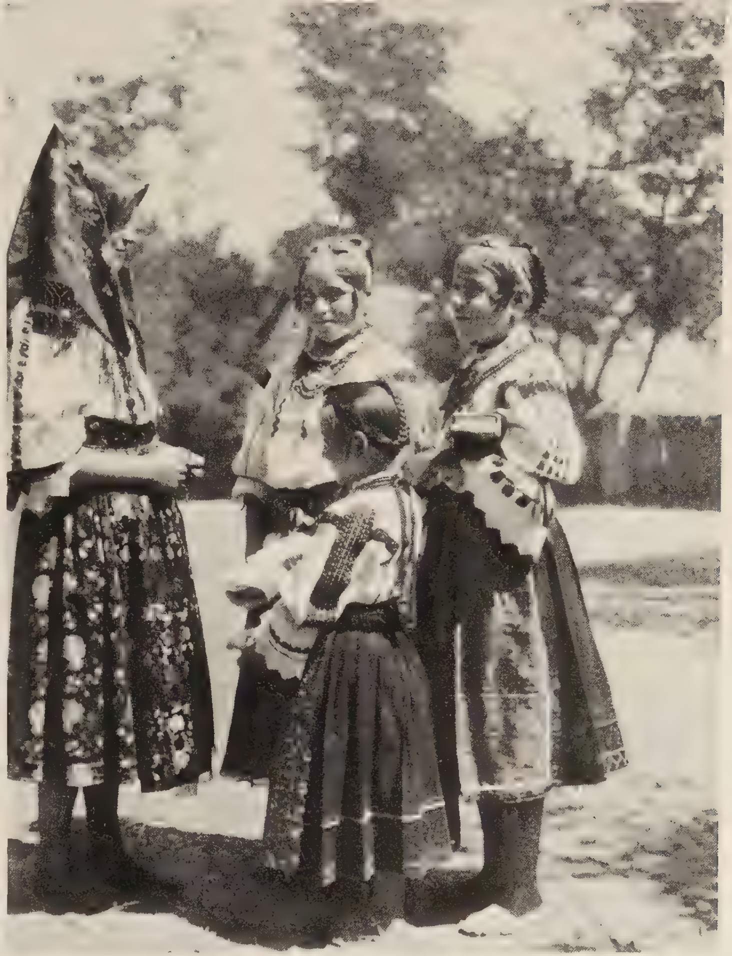
ILLYRIAN TRIBES FOUNDED CELJE 200 YEARS BEFORE THE CHRISTIAN ERA

This ancient city on the Savina, a tributary of the Sava, in Slovenia, fell into the hands of conquering Celts in the early years of its existence. Later it became a Roman fortress against the barbarians. For 13 centuries it has been in the possession of Slavic people. During the Crusades it served as one of the most important stations between western Europe and the Holy Land, but sank into comparative oblivion after interest in those expeditions waned. Since the World War it has been a part of Jugoslavia and is showing signs of revived life. The ruin in the foreground is that of the feudal castle of the counts who ruled the country in the Middle Ages.

Photograph by Melville Chater

FURZE SERVES AS KINDLING IN CROATIAN COAST TOWNS

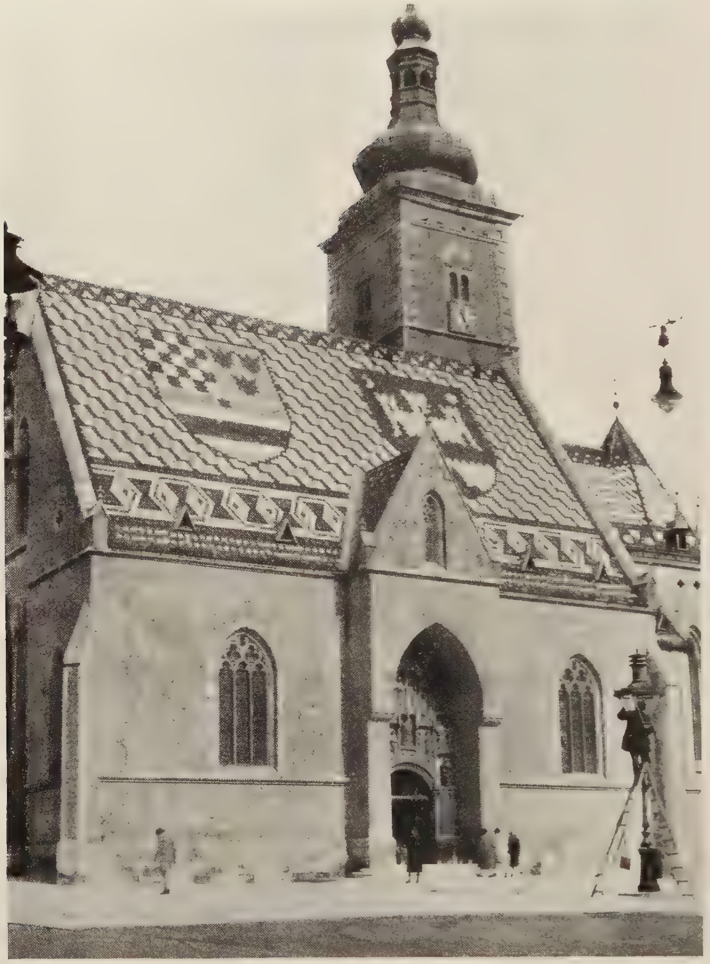
Wood is at a premium here and in Dalmatia, for the country was stripped of forests for lumber to build Venetian galleys centuries ago.



© Hungarian Press-Photographic Exchange

SAVA RIVER SLAV GIRLS DELIGHT IN FINERY

Necklaces of Hungarian coins and embroidery in elaborate designs are distinctive touches in the costumes worn by this group.



Photograph by Melville Chater

ARMS OF THE CITY (RIGHT) AND OF CROATIA (LEFT) ADORN THE ROOF OF ZAGREB'S ST. MARK'S

King Bela IV of Hungary rebuilt this Gothic church after the invasion of the Tatars in the 13th century. It stands in St. Mark's Square, which has viewed the pageant of Croatian history.

as pastures yielded to wild ravines and snow peaks rose against the blue.

"GOV'MENT GRAPES, TOO!"

"Have some American grapes!" called a peasant, as we halted once in Slovenia's lowlands. And, "Sure," we laughed back. "Make it Concords or Delawares!" But the laugh was against us when he arrived with some luscious clusters of those very varieties. In fact, as a result of war-time phylloxera, they were grown on Government-imported vine stock from the United States.

Three-quarters of Jugoslavia's vine areas have been renewed from the same overseas source, under Government regulations that stipulate for each Jugoslavian vineyard the reservation of one hectare of American plants for grafting purposes.

So much the farmer explained. And Laurence, who had overheard somewhat of it, muttered to himself, "Gov'ment *grapes,* too! Well, I'm switched!"

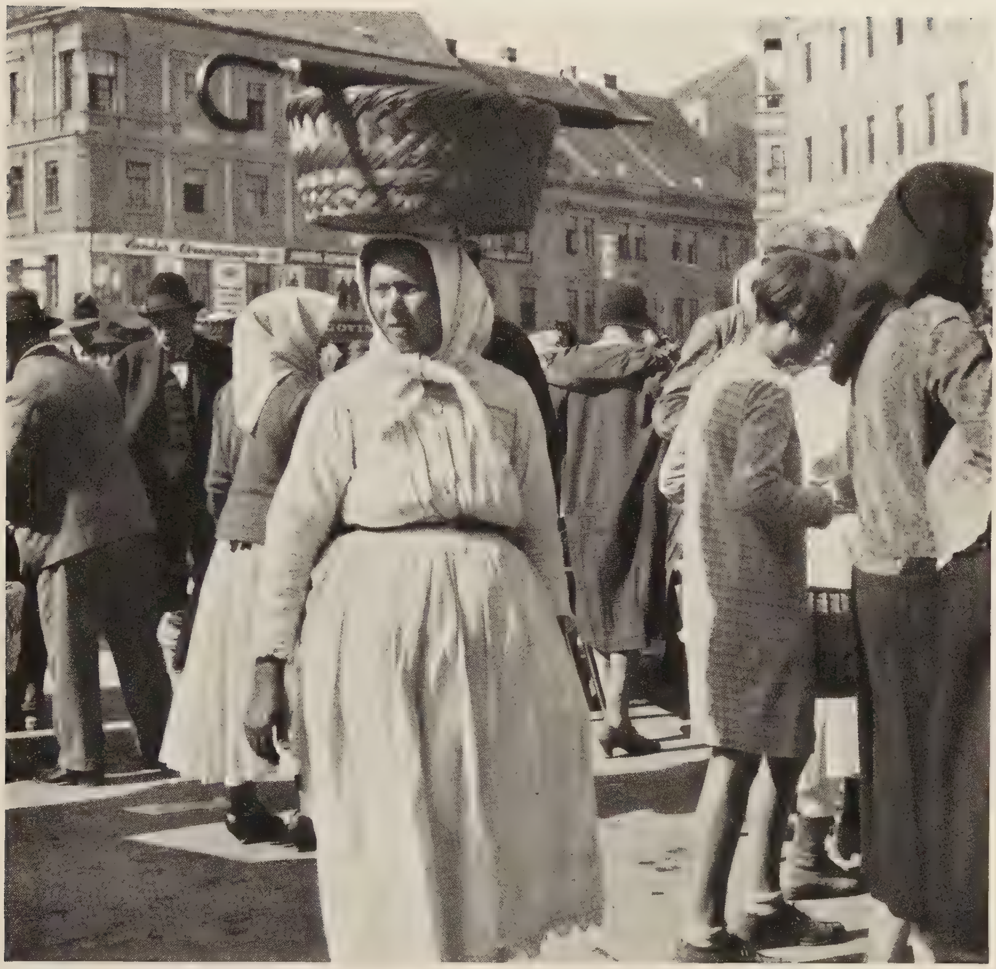
We neared Slovenia's westernmost limit, where, tucked away between the Julian and Karawanken ranges, lies that little sub-Alpine idyll, Lake Bled. With its island-set pilgrimage church and its overlooming castle, it might be some scene on a medieval tapestry (see Color Plate XII).

At the pleasant Styrian town of Maribor we encountered a tourist agent who told us that we really must visit near-by Rogaška Slatina. He said there were baths there.

"Roman baths?" we chorused.

"Roman baths of course," he assured us, mistaking our apprehension for enthusiasm. "Very famous. Everybody visits them." And, recollecting Banjaluka (see text, page 291), we smiled wanly. No more archeological remains for us.

Next day Laurence misread his road map, and that afternoon we turned up by accident at a delightful spalike resort, cupped among green hills. There were garden-bordered promenades and Greek pavilions, and a band playing, and people drinking the waters. A perusal of our pre-war map revealed that we were at Rohitsch-Sauerbrunn, with hotels, hydrotherapy, and baths—the actual, not the archeological, thing—at our disposal.



Photograph by Melville Chater

FOLK COSTUMES MINGLE WITH MODERN DRESS IN ZAGREB MARKETS (SEE PAGE 305)

We remained there for two days, rejoicing in a perfect bathing orgy; and it wasn't until we bought some picture postcards captioned with "Greetings from Rogaška Slatina!" that we discovered we had been staying in the very place we had sought to avoid. In fact, that designation is the Slav replacement name for Rohitsch-Sauerbrunn. As for its "Roman baths," our informant had evidently meant the modern, calorific thing and not ancient *thermæ*.

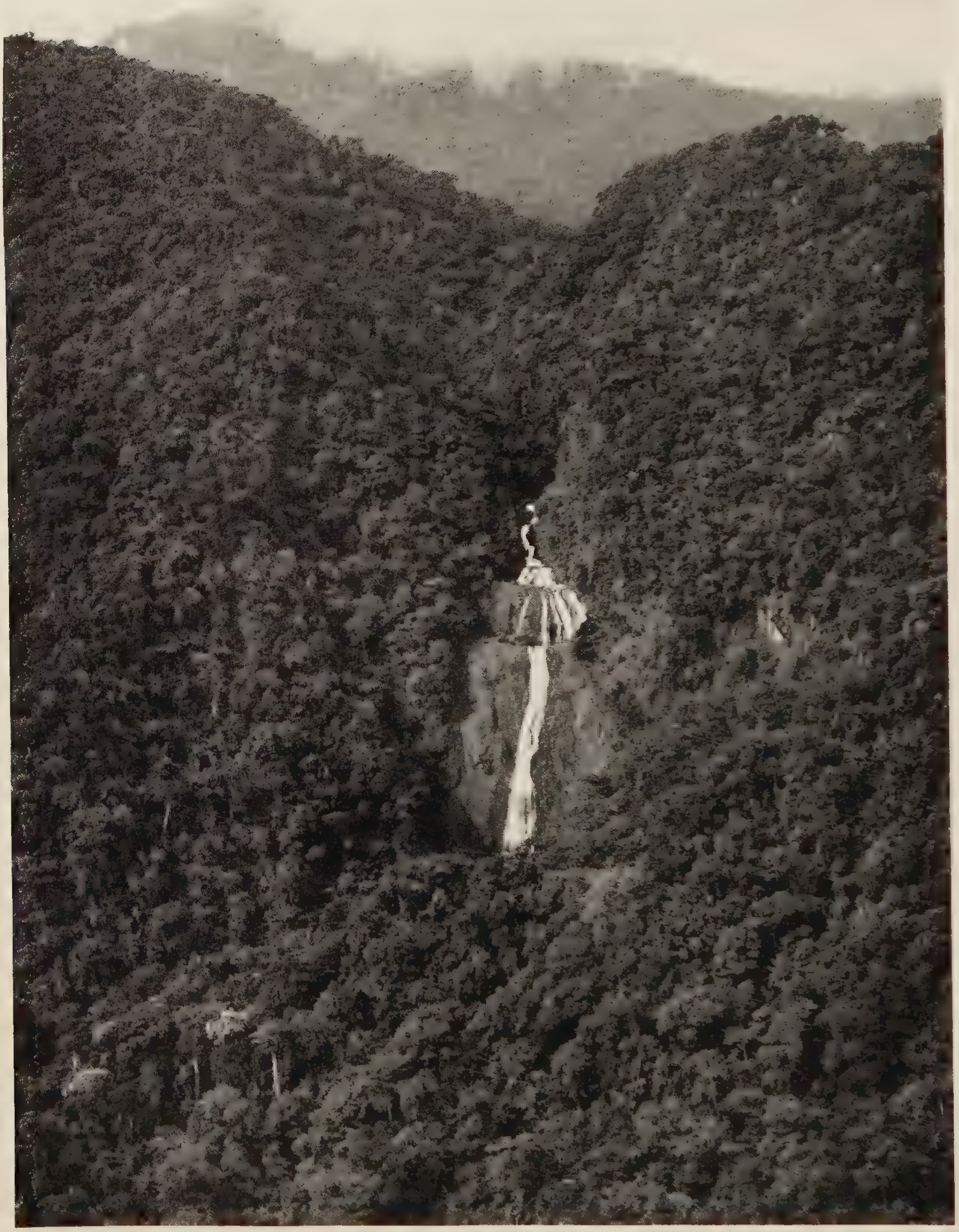
All of which shows what taking the wrong turning will do when luck is with you.

CHICKEN À LA MARYLAND AT LAST

The last echo of our Jugoslavian travels came several days later, when, just over the Hungarian frontier, we stopped in a village for lunch. Like so many villages in our immediate past, it offered nothing more appetizing than a sort of denationalized Irish stew. After lunch we encountered Laurence as he leaned over a fence inclosing some poultry. Gloomily he inquired, "I s'pose dey's *Gov'ment* chickens?"

"Oh, no," we told him. "We are out of Jugoslavia." And Laurence seemed to breathe a sigh of relief.

Far be it from me to inquire into Laurence's private affairs. I only know that that evening—we were still in the zone of unappetizing food—he presided in the kitchen of our inn, and that we all, Laurence included, dined magnificently on chicken à la Maryland.



IN THE HEART OF PRIMEVAL WILDERNESS ON THE ISLAND OF LUZON ROARS A 500-FOOT WATERFALL

This cataract, more than twice as high as Niagara, was found by members of the Sixth Photographic Section, U. S. Army, and named for Hon. Henry L. Stimson, then Governor General of the Philippines, and now Secretary of State.

THE UNEXPLORED PHILIPPINES FROM THE AIR

Map-making Over Jungle Lands Never Before Seen By White Men

BY LIEUT. GEORGE W. GODDARD, U. S. A.

With Illustrations from Photographs by the Author

THE Philippine Islands are not all so thoroughly civilized and so thickly populated as Americans generally believe. Approximately 25,000 square miles of insular territory, most of it mountain jungle land, is listed on Government survey maps as "unexplored."

We of the Sixth Photographic Section, U. S. Army, at Nichols Field, near Manila, were glad of the opportunity for a flying expedition over a strip of this unexplored land in the northeast corner of the island of Luzon, largest of the Philippines, on the west coast of which Manila is located. We set out one sunny morning with three Army airplanes for extensive work in aërial photography and photographic mosaic map-making.

Always there is a thrill of interest in flying over territory one has never seen before. We could not tell what might be revealed. But it was only too easy to see that a forced landing would have entailed risks other than the usual hazards of such experiences.

PHILIPPINE MAHOGANY MARKETED BY THE JAPANESE

Lumbering in this district is largely in the hands of Japanese. We saw a freighter flying the Japanese flag lying off the coast and loading Philippine mahogany taken from the more easily accessible forests along a river and floated down to the sea. The logs taken out are five and six feet in diameter, and are floated out to the ships on bamboo rafts. Some of the finest cabinet woods in the world come out of these dense jungles.

The purpose of our work was threefold. We were to gather information, mostly photographic, that would enable the Bureau of Forestry of the Philippine Government to make a timber survey. The Bureau of Lands also was anxious to determine if any of this territory might be parceled out to settlers. It adjoins the fertile valley of the Cagayan River.

Our most important objective was to furnish the Coast and Geodetic Survey with a set of photographs to be used as plane-table sheets.

We succeeded in photographing altogether about 5,000 square miles; also we found and photographed a 500-foot waterfall—never before seen by whites so far as we know—which we named for the then Governor General of the Philippines, Henry L. Stimson (see opposite page).

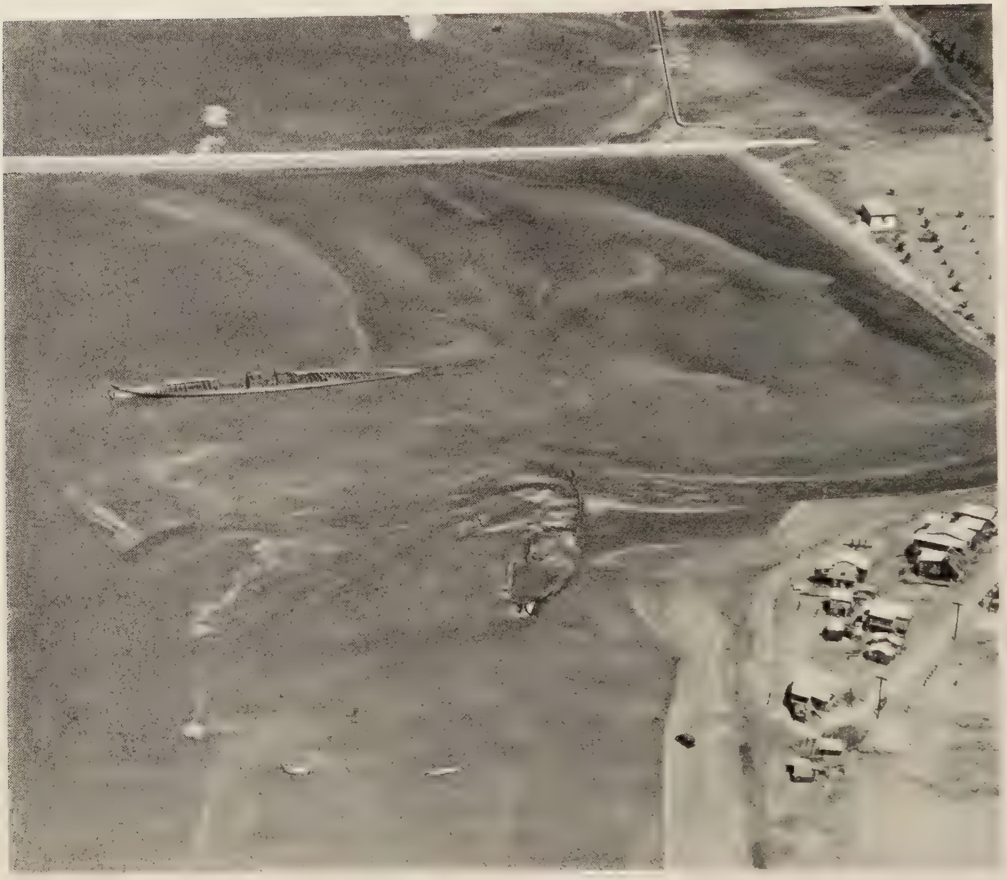
Previous photographic work of a similar kind on the island of Mindoro, and on the Bataan Peninsula, west of Manila Bay, had given us some idea of what to expect. Our greatest risk was in a possible forced landing.

In actual mapping work, Lieut. H. R. Wells and I were to pilot two De Havilland photographic planes, each carrying a noncommissioned officer to operate the cameras. We planned that we would always fly together, so that in case of a forced landing on the treetops, the other plane could go back to the base and send out the Martin bomber with mattresses, mosquito netting, cans of water, emergency rations prepared in tins, and rifles and ammunition enough to last us until rescuers could bolo a passage through the jungle to us.

We would have to drop with parachutes, of course, if anything happened, and we planned to spread these 'chutes out on the treetops as markers and use our smoke flares so the bomber could find us.

SUPPLIES TIED TO WINGS OF PLANES

The two De Havillands and the two-motored bomber started out from Nichols Field so heavily loaded with mail, equipment, and supplies that we were somewhat doubtful whether they would leave the ground. On the De H's we even had



HERE REST THE GUNBOATS SUNK BY ADMIRAL DEWEY

Mute reminders of the Battle of Manila Bay lie offshore from Fort San Antonio Abad, a part of which may be seen at the upper right. The construction work in the background is the new breakwater.

boxes of stuff tied to the wing surfaces next to the fuselage. The big plane had more than a ton of supplies on board.

Nine persons in all made the trip, including a news reel cameraman, aërial photographer, and mechanics.

We flew due north to Aparri, northernmost port of the Philippines, which was to be our first base of operations, making the journey, 350 miles, in three hours and fifteen minutes. On a boat, the trip takes four days. The flight gave Philippine postal officials some idea of what might be done with air mail service in the Islands.

On the way up, passing Mount Arayat, about 50 miles out of Manila, we got a taste of bumpy air that was to bother us many times later. Wind currents sweeping up out of the warm valleys cut some queer capers when they strike cross currents over the mountain tops. We were flying at about 6,000 feet, and it was all we could do to stay in the ships. These same tricky currents added to difficulties by forming cumulus clouds through which it was impossible to take photographs. They spoiled many a day's work for us later on.

The main part of this journey to Aparri was over beautifully cultivated land, the famous rice terraces of the Bontoc region and the tobacco lands of the Cagayan Valley, laid out in great squares of green.

APARRI IS THE JUMPING-OFF PLACE FOR CHINA

Aparri is the jumping-off place for China and Japan. Also it is in the path of most of the typhoons originating near the island of Guam. These follow a fairly regular

PALAUI ISLAND LIGHTHOUSE, ONE OF THE MOST WESTERLY OF AMERICAN GUIDES FOR COMMERCE

Typhoons originating near Guam sweep past this point off the northeastern end of Luzon and menace the traffic with China and Japan (see text, page 315).

course, sweeping across the northern Philippines and the China Sea, then up the China coast. Fortunately, we were a little ahead of the typhoon season, but, as an emergency precaution, we made arrangements with the constabulary to store the planes and equipment in an old Spanish church built of stone, not far from the landing field, if the need should arise. The old padre was very accommodating, agreeing to hold up services if necessary to get the planes inside. We drilled the crew for a quick take-down, and were pretty well prepared.

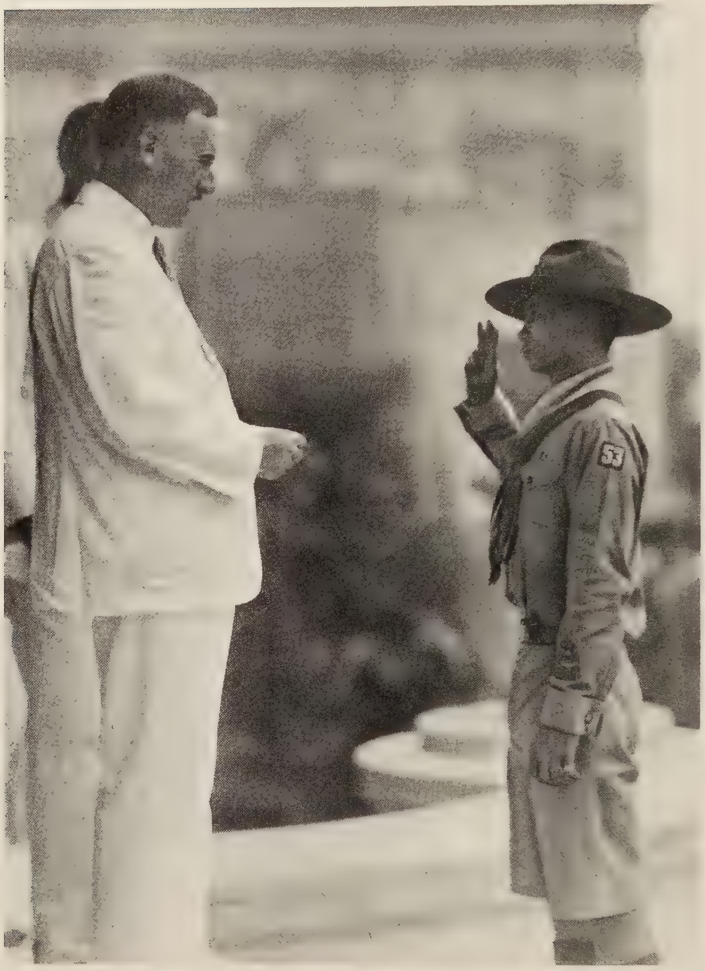
The crowds that turned out to see us in Aparri caused us a little nervousness. Young and old, sick and well, came from miles around, riding carabaos, ponies or any available conveyance, whole families and tribes of them. We engaged constabulary guards to watch the ships and the stores night and day, for souvenir hunters are not confined to the mainland.

But the curiosity made manifest here was mild compared to that of the really wild natives with whom we hobnobbed down on the east coast.

WILD TRIBE FLEES AT SIGHT OF PLANE

On our first flight out from Aparri we had a glimpse of a wild tribe of unusual stature—for Filipinos. We had been up for about an hour, and had cut over east to the coast line, flying down very low over the rocky beach, not more than ten or fifteen feet off the sands, when we caught sight of these big people.

The first view we had of them showed little but their heels and backs. They were terrified by the great bird that swooped down out of the sky, and were making for the woods with all speed. We were going



DECORATING A FILIPINO BOY SCOUT FOR BRAVERY

The American official bestowing the award is Gov. Gen. Henry L. Stimson, who resigned that post in the Philippines to become Secretary of State.

fast enough to circle and come down on them before they had a chance to get far.

They were dressed about like the rest of the Philippine natives we saw, the main article of clothing being a cloth around the loins; but their houses were different. For protection against high winds they were built against the boles of big trees, lean-to style, made of nipa grass and palm fibers. Careful construction would be wasted effort, for the typhoon devil destroys their dwellings several times a year as it is.

We could see the cooking fires they left on the beach. All their belongings were scattered about in their haste to get away when we came along in the plane. The men could run faster than the women and children, so the latter were left behind to escape as best they could. We left the lame and the halt and the weak and the small scrambling for the forest and went on about our affairs.

We began serious work the next day in the De Havillands, and found that the careful plans we had made for staying together in mutual protection against forced landing were highly impractical.

WORKING AT A 12,000-FOOT LEVEL

Our working level was as close as we could get to 12,000 feet. It took about an hour to reach this height. Lieutenant Wells and I, each with a man to operate the cameras, usually left Aparri between 6:30 and 7:00 o'clock in the morning, and flew for four or five hours a day.

We found that we could stay together until we reached the working level and started shooting pictures, but after that we soon became separated. Flying at more than 100 miles an hour, and with so many things to keep in mind, we would forget to keep watch for the other plane. We simply had to go it alone and hope the motors wouldn't fail.

Once I felt sure we had it coming to us. Sergeant Stockwell, my cameraman, and I had lost the other plane, as usual. There must have been some water in my gasoline. We were about half through the morning's work when the motor sputtered and almost stopped. I figured we had enough altitude to get to the Pacific on the east side of the island, so we turned around and started a long glide. I switched over to my emergency gasoline tank in the upper wing of the airplane and pumped frantically.

We made the coast line, but when we reached it, one look at the enormous swells dashing against the rocks made me wonder if we wouldn't have done better to make parachute jumps back where the motor started missing.

These swells, some of them 20 feet high, do not appear on the China Sea side of the island. From the air, they make a great white streak along the coast, but looking at them closely gives another impression entirely. It looked like suicide to try them in a land plane, but the rocks on the beach were worse. Just as I was getting ready to take a deep breath, the motor started to pick up again and allowed itself to be nursed back to life. We headed back for Aparri and landed safely.

Lieutenant Wells (Deacon, we called him, because of his ministerial ability) came in half an hour or so later with another experience. He had found a 500-foot hole in the air, close by a mountain top. He was flying along at the working altitude of 12,000 feet when suddenly he commenced to settle, and his altimeter went down 500 feet in a few seconds.

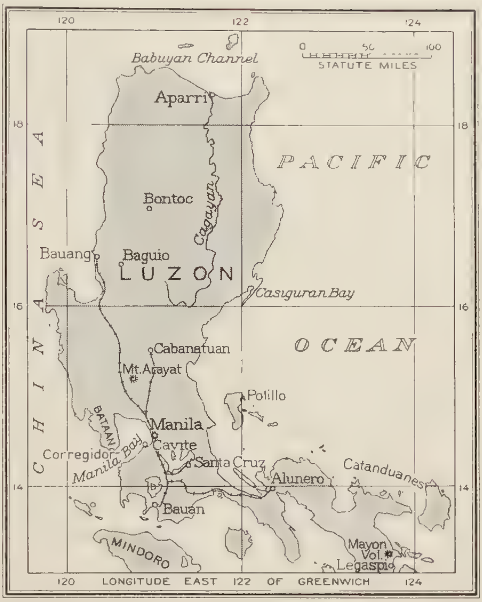
I went back the next day after we had taken the water out of my carburetor and gasoline tanks. It couldn't be done. She just wouldn't pick up.

We both flew over the same area later, and with the same experience. That hole in the air stayed in that same place day after day, and as it was an important location for pictures, we spent some hours trying to conquer it. We never did.

This is a typical example of the kind of difficulties that beset air photography in the Tropics. One has to know his air currents.

FLYING LABORATORY AIDS WORK

Our photographic work was greatly aided by a portable flying laboratory which we brought along in the bomber. We set this up in the field under a tent soon after landing and prepared to make tests of our film on the spot, so we could tell just what we were getting.



Drawn by James M. Darley

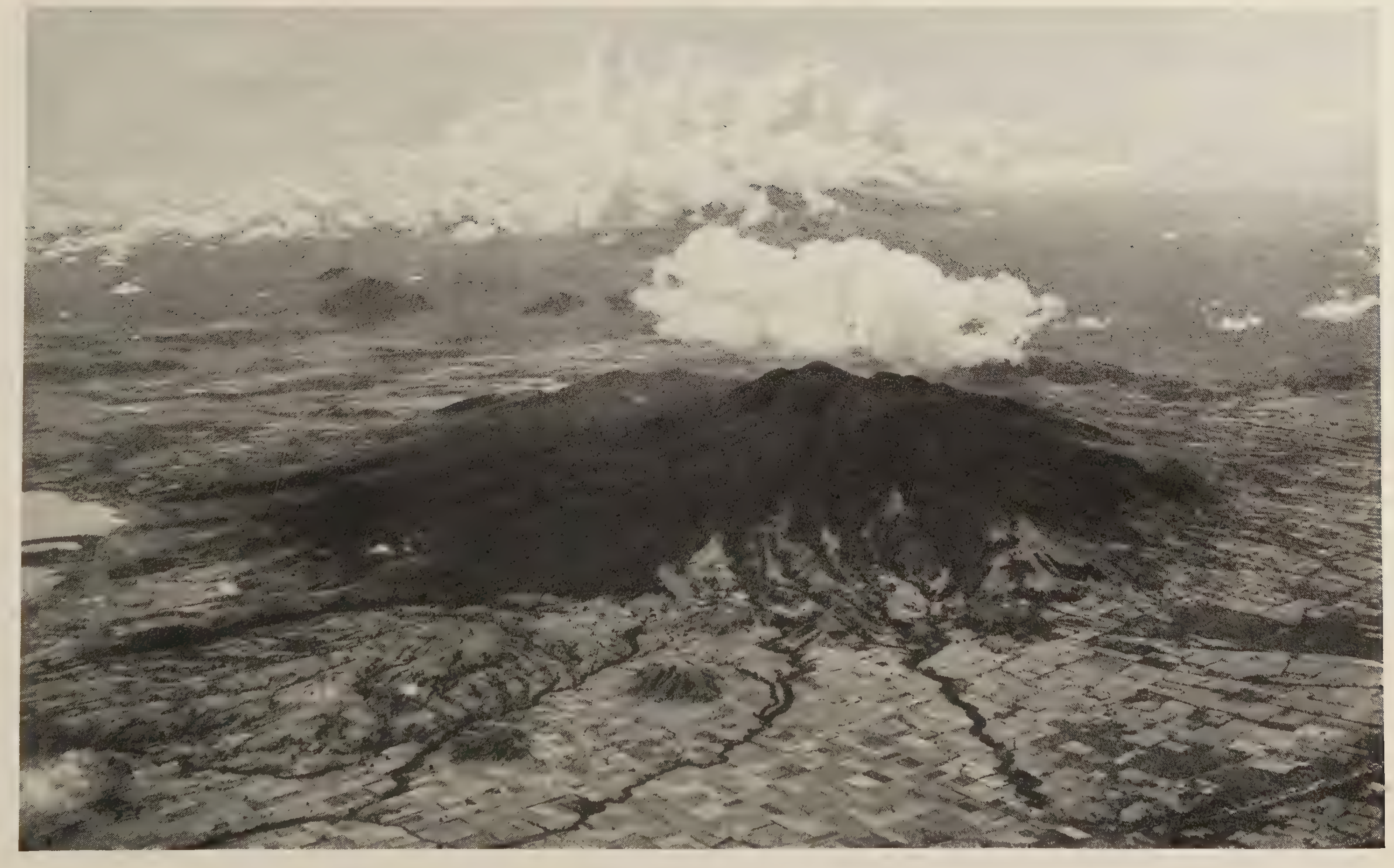
THE NORTHERN HALF OF THE PHILIPPINE ISLANDS

The author's photographic party established its airplane base at Aparri, and did much of its 5,000 square miles of aërial surveying between the eastern coast and the Cagayan River. Another base was established subsequently on Casiguran Bay.

This laboratory had been planned and built at Nichols Field. It included a collapsible dark room and all paraphernalia for making test developments, and it served the same purpose as the flying laboratory I had developed previously for use in the States, though the Philippine apparatus was small enough to be worked in the ship while flying, and pictures could be taken and finished in the plane in eight minutes.

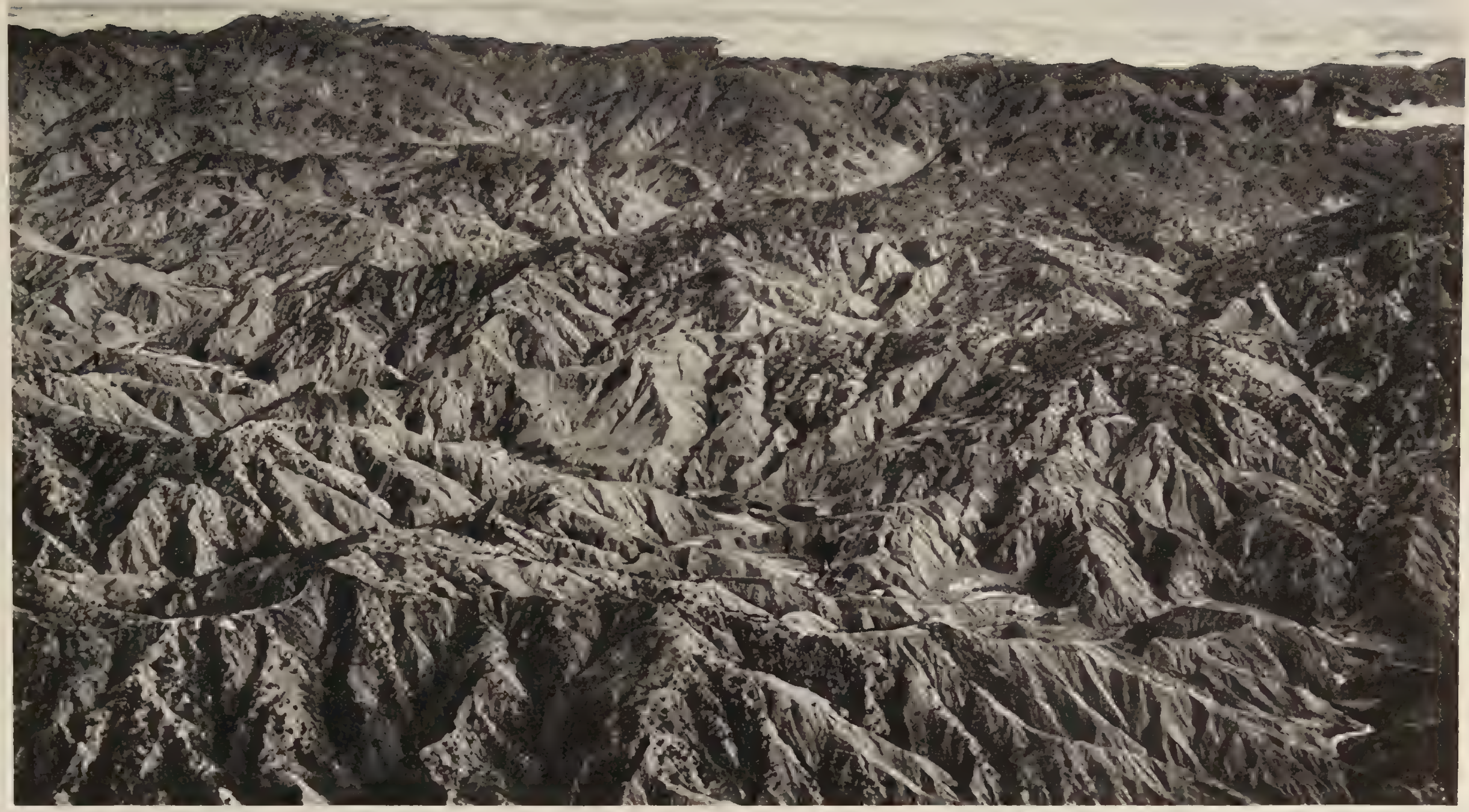
Through it all, the greatest difficulty was the weather. Regularly each morning, between 7:30 and 8:00 o'clock, clouds would form along the mountain tops. We came to expect them, know their approximate locations, and to learn to work around them whenever possible. In the Philippines we get our good weather all at once, with many of the best flying days crowded into March, April, and May. We had the best season for our work, but, even so, it was exasperatingly uncertain.

One day we heard a rumor of a typhoon moving up our way from Guam. It never did reach us, but it served as an introduction to the weather man of Aparri, who



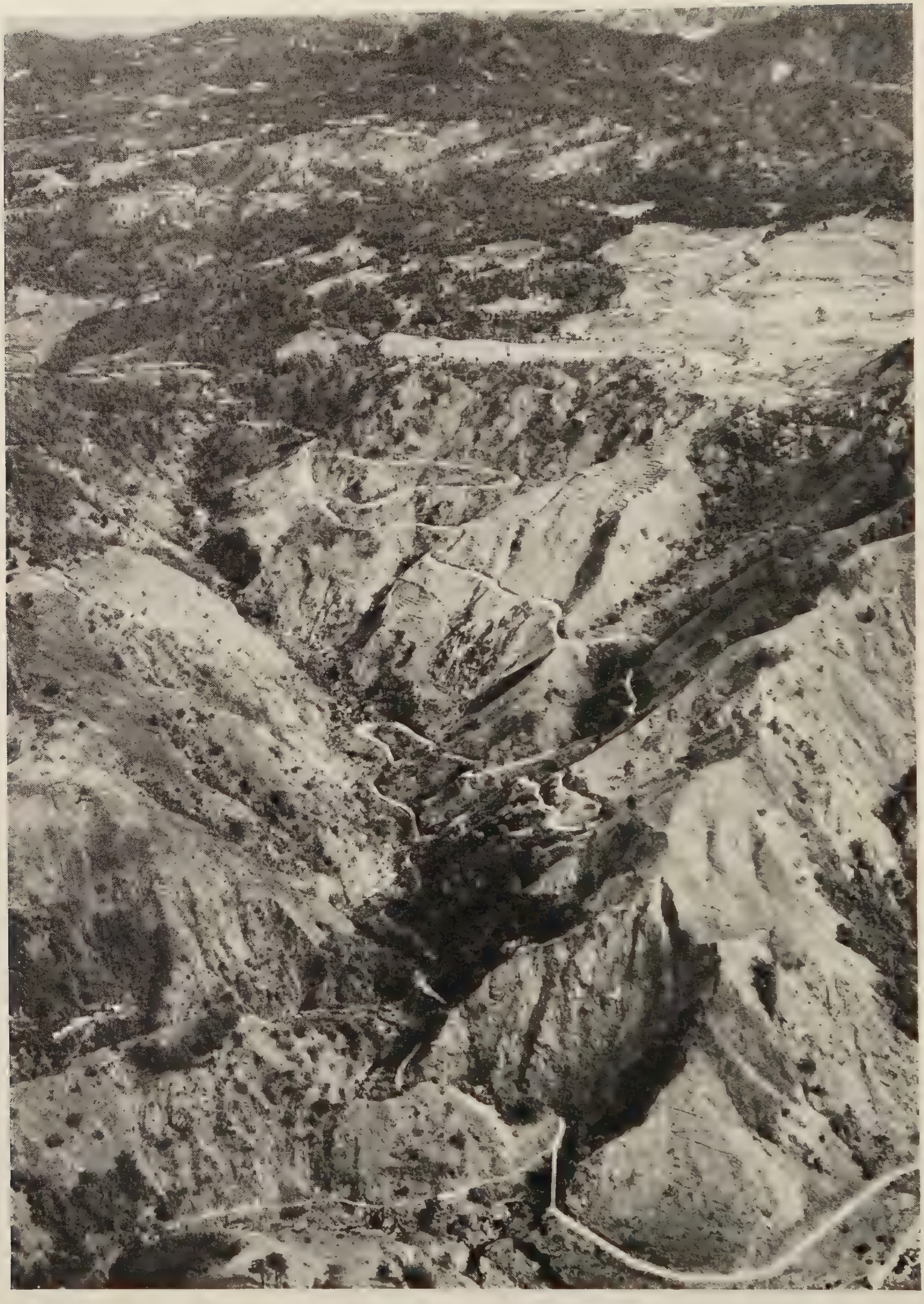
FROM AN AIRPLANE CULTIVATED FIELDS SURROUNDING MOUNT ARAYAT RESEMBLE A MOSAIC

The expedition passed over this extinct volcano, 50 miles north of Manila, on the way to the base at Aparri. Wherever topography permits, the primitive tribes of the Bontoc country engage in intensive agriculture, for the whole region is densely populated (see, also, illustration, page 322).



GOLD WAS FOUND IN THESE BENGUET HILLS MORE THAN A THOUSAND YEARS BEFORE MAGELLAN VISITED THE PHILIPPINES

Mines are still operated here. The river cutting through the rugged waste is the Agno. Some settlements surrounded by small irrigated fields may be seen along the stream. As such topography is not conducive to safety in case of a forced landing, the survey party was flying at an elevation of 12,000 feet when this photograph was made.



BENGUET TRAIL AFFORDS A SMOOTH MACADAMIZED HIGHWAY TO BAGUIO

Though the road was less than 30 miles long at the time of its opening, it cost nearly $2,000,000. The expense account indicates the tremendous engineering difficulties the rugged country imposed on the builders. Even to-day, native laborers are constantly at work breaking rock for repairs (see, also, "Some Impressions of 150,000 Miles of Travel," by William Howard Taft, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1930).

turned out to be one of the most interesting characters we met. We went up to see him about that alleged typhoon, got to talking with him, and went back almost every day thereafter.

He was an old Spaniard with a long beard and a wizened, weathered face. I think he has the stormiest job in the world. His little shack, built halfway into the ground like the natives' huts on the small islands north of Luzon, is directly in the path of nine out of every ten typhoons originating in the typhoon cradle near the isles of Guam and Yap. No ordinary structure can stand the force of the wind.

We used to go up and try to talk him into giving us some good flying weather, but with little progress.

"No, sir," he used to say in his broken English, "you can't talk me into any good weather. If it isn't there, you can't have it, that's all. You can take it or leave it. Now, if you'd come along when we had that typhoon in 1906——," and then he was off on some of his reminiscences. He liked to describe what would happen to one of our planes if a typhoon should hit it. Our best chance of landing would be off in China, 400 miles to the northwest, he thought.

FLYERS FIND THEMSELVES OVER A VOLCANO

Clear skies finally appeared and we were off for an area approximately 150 miles from our base. As usual, the planes became separated, but Stockwell and I proceeded with our picture work, shooting about a half roll of film before we were stopped by clouds which formed very rapidly.

The jungle was totally obscured before we had covered 50 miles of our homeward flight. We worked our way through the clouds and finally came out in a valley which ran in the opposite direction from our course.

Straight ahead was a mountain range with clouds hanging a few feet above and on the opposite side of this range we found ourselves over a volcano which we proceeded to explore. We flew around inside of the crater for several minutes taking photographs of the bubbling sulphur pool and clouds of steam which were belching forth from six or seven points.

The crater was big enough so that we could fly out of a large open place on one side and head for the landing field with another tale to tell. Later we went back again to take additional photographs of the volcano and its location. Nobody had ever seen it before, so far as we could learn. The crater is about 500 yards in diameter and about 4,000 feet above sea level. It is at the head of a line of volcanoes which run south through the Philippine Archipelago and the East Indies.

The best known of these volcanoes is Mayon, which we photographed two months later when it was in eruption and causing considerable alarm. The American Red Cross and Philippine Weather Bureau were extremely anxious to have aërial photographs taken of the crater and of the lava flow, so as to show definitely the seriousness of the situation. They requested assistance from the War Department and the mission was immediately assigned to the Sixth Photographic Section. Lieut. John D. Corkille, one of the Army's best pilots, was detailed to fly the mission and I was detailed to handle the camera work (see page 326).

Most of the trip southeast was over water, so we decided, for safety's sake, to use a Loening amphibian airplane. We left Manila at 2:00 p. m., June 30, with two aërial cameras, two standard motion-picture cameras, my 16-mm. home-movie outfit, emergency rations, and our life preservers.

AN ATTEMPT TO CLIMB OVER A STORM

The weather for 200 miles was ideal, but at a point approximately 50 miles from the volcano we ran into a severe thunderstorm, with black cumulus clouds extending up to about 12,000 feet.

We decided that instead of turning back we would take a chance and try to climb over the storm, so for the next 20 minutes we gained our altitude and started milling through the passageways between the clouds, which, as we proceeded, towered to 16,000 or 17,000 feet.

Estimating our direction and distance, we believed, after 30 minutes' flying, that we should be somewhere in the vicinity of the volcano. The clouds were now beginning to open up, which indicated that we had flown over the worst part of the storm, and, although we could not see the

FLOATING MAHOGANY LOGS MAKE LANDING PERILOUS IN CASIGURAN BAY

These great tree boles, brought to the port on bamboo rafts (right background), are ready to be loaded on a Japanese steamer (see text, page 311). The flyers nearly came to grief in taking off in the midst of such a flotilla.

ground, we managed to descend to 9,000 feet and spent the next half hour milling around.

All of a sudden, as we were passing along a very narrow opening between the clouds, our plane was thrown almost upside down. Cameras flew in all directions inside of the hull of our boat, and immediately we both felt a dry, burning sensation in our throats.

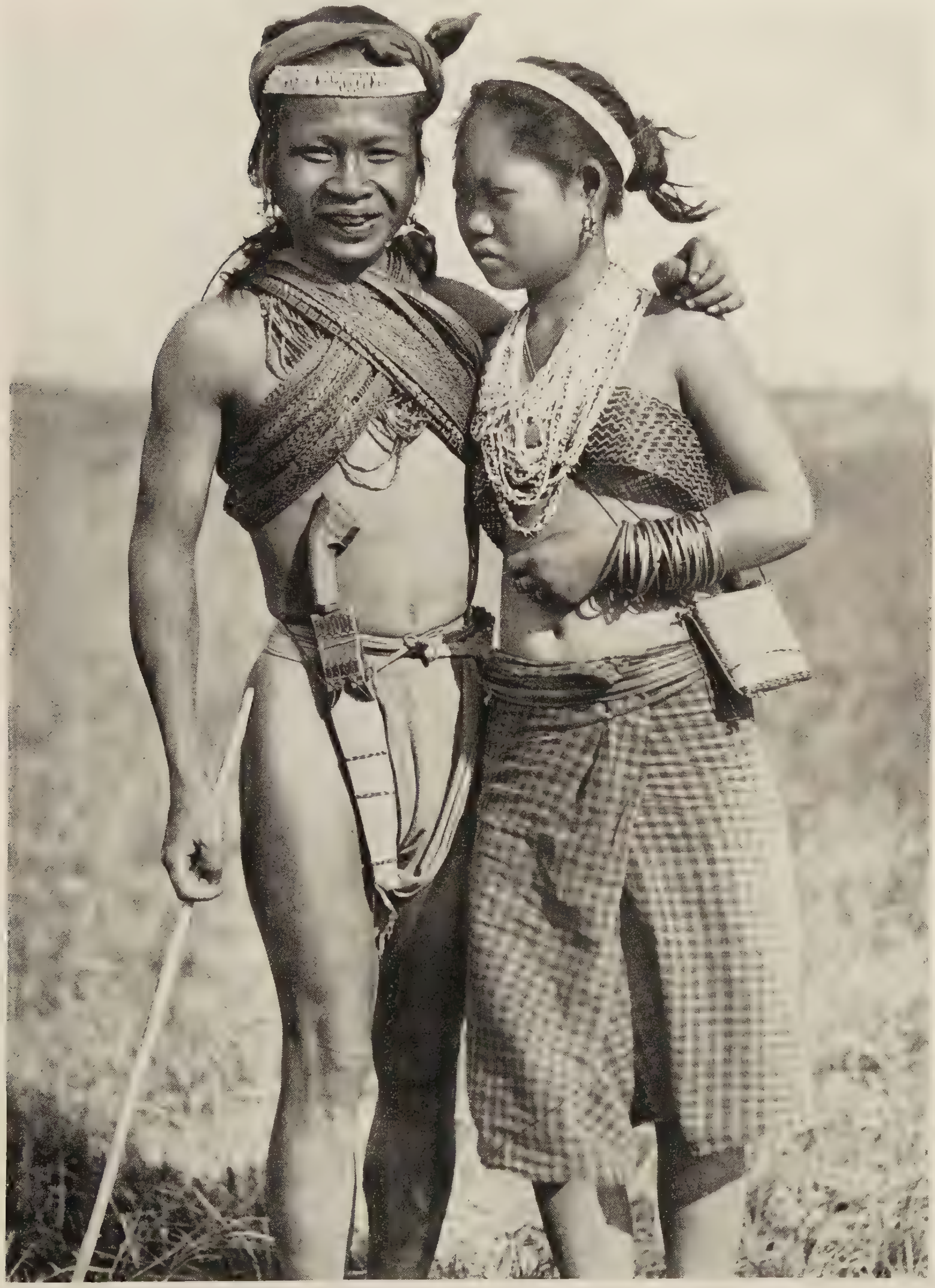
We knew for sure that we were very close to Mayon!

Before Lieutenant Corkille could right the plane, we were flying blindly in a cloud and minutes seemed like hours before we had worked our way out. We cautiously proceeded to climb where there was more room to maneuver. At last we were rewarded with our first glimpse of the volcano, with about 500 feet of its cone protruding through the clouds.

It was a magnificent sight to witness the flames, clouds of ashes and yellow smoke belching forth from the crater. In a few minutes, more of the volcano was visible and we could see the 300-foot stream of molten lava pouring out of the fire pit and running down the side of the cone.

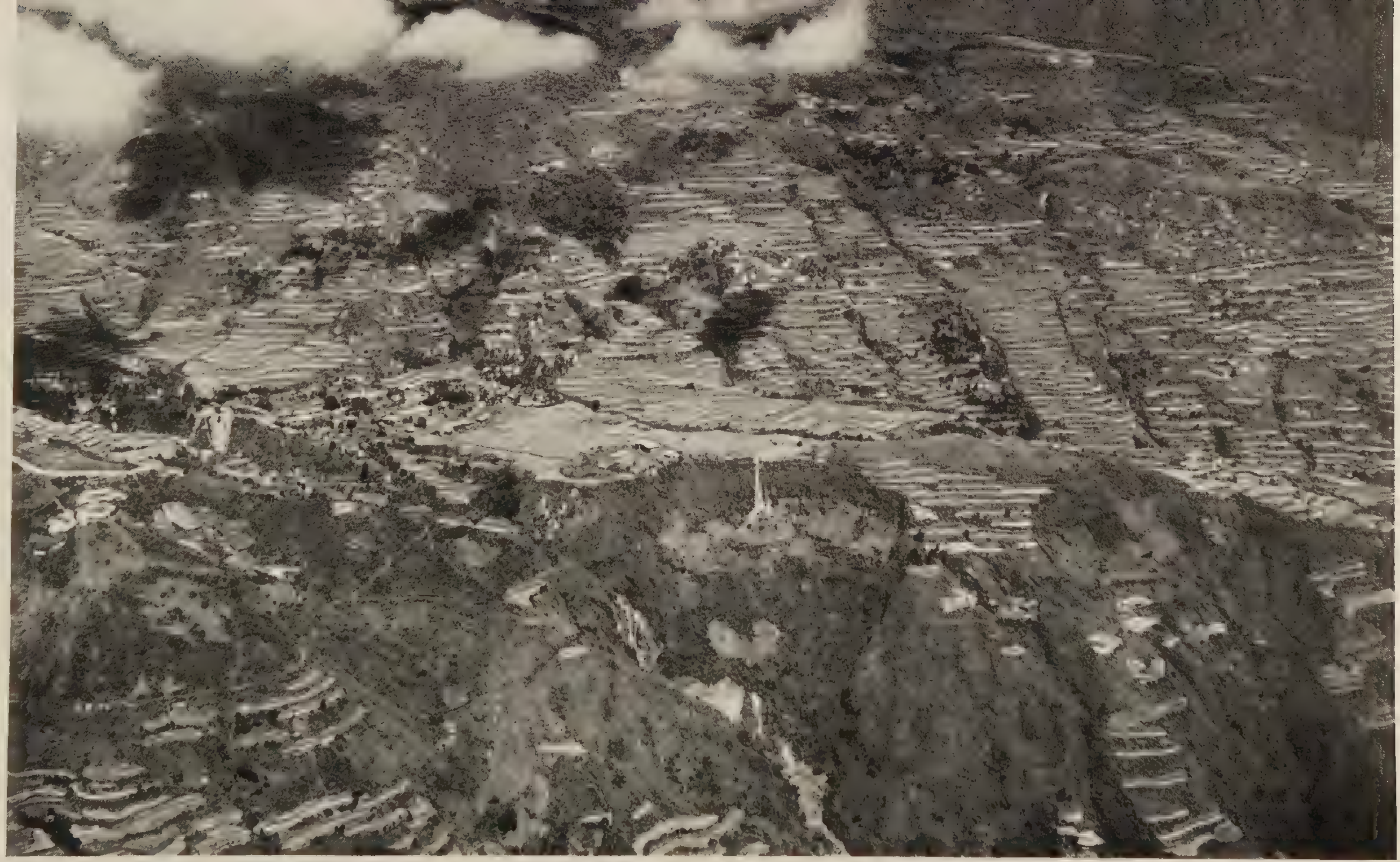
The light at this time was so poor that photography seemed out of the question; however, we made a few single exposures at very slow shutter speeds, but did not attempt to take movies. We descended through rain and clouds, landing at Legaspi 20 minutes later.

All night we watched the endless stream of refugees from the fury of the volcano, which presented an awesome but magnificent spectacle. The stream of lava which had appeared black to us in the air was now a river of fire. As it flowed it branched off into numerous streams. Occasionally an enormous white-hot rock was hurled high into the air with a terrible roar, leaving a trail of sparks as it rolled down the side of the volcano.



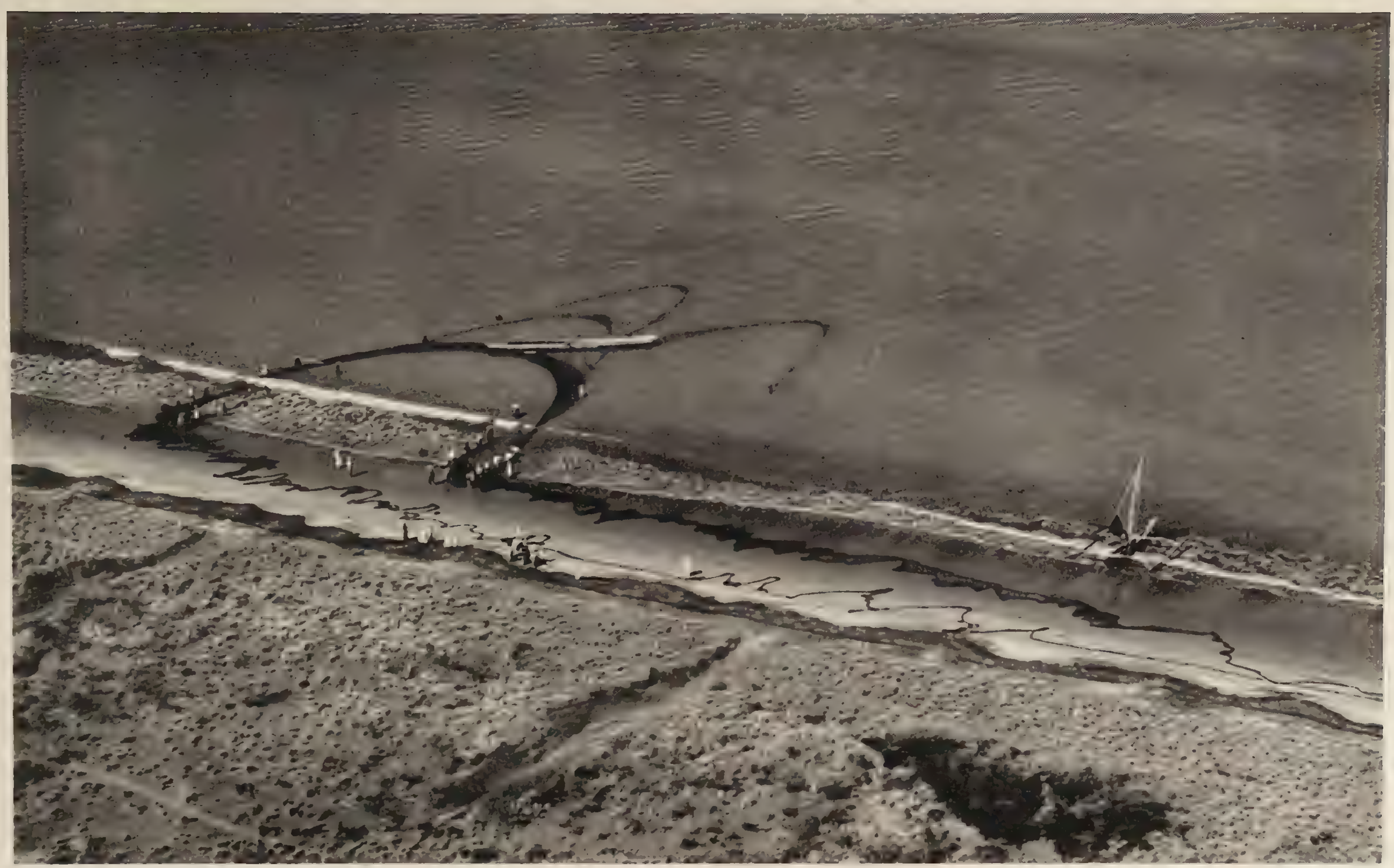
DRESSED FOR A HOLIDAY, A MANGYAN COUPLE VISITS THE FLYING FIELD

The tribe to which these young people belong is one of the most primitive in the Philippines, yet they have an alphabet, probably of Hindu origin, that has come down from their forefathers. Letters are written from left to right on banana leaves or joints of bamboo.



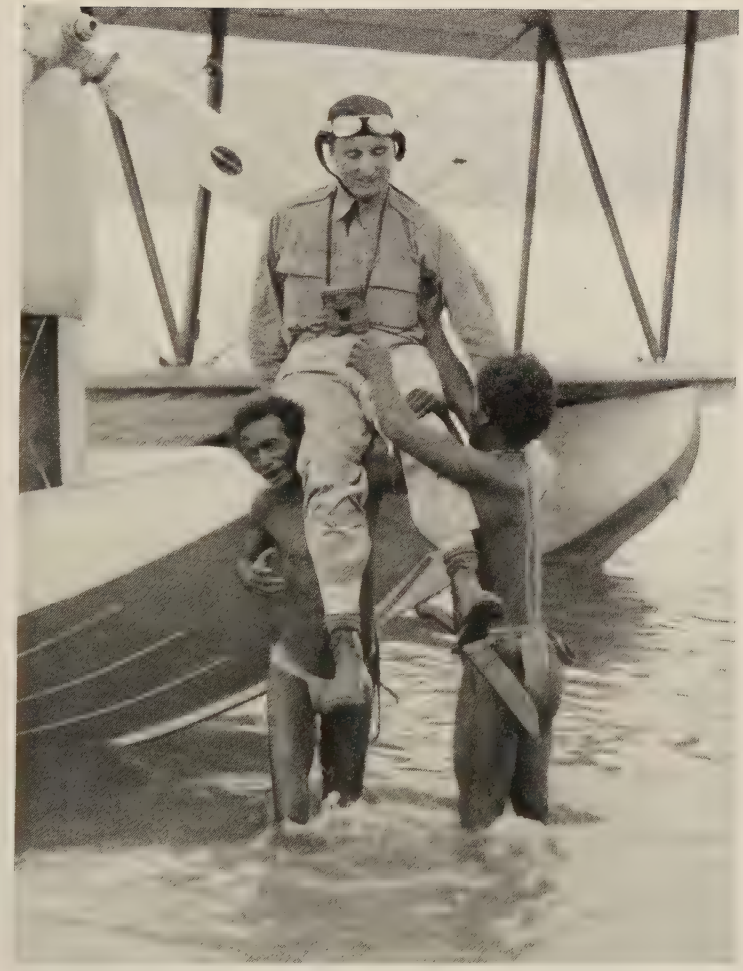
MASTERLY ENGINEERING FEATS BY UNTUTORED PAGANS BUILT THE RICE TERRACES IN THE MOUNTAINS OF LUZON

In the subprovince of Ifugao about 132,000 primitive tribesmen live on a plane area of 750 square miles, less than one-fifteenth of which is cultivated. This means that more than 2,000 people derive subsistence from each section of tilled ground. Working with wooden shovels, these natives have erected around their garden patches walls of dirt and stone a foot or more thick and often 40 feet high—walls which if placed end to end would extend half around the world at the Equator. The enclosures contain mud and water in exactly the right proportion, and are so constructed that excess water passes immediately to lower levels, where it is needed.



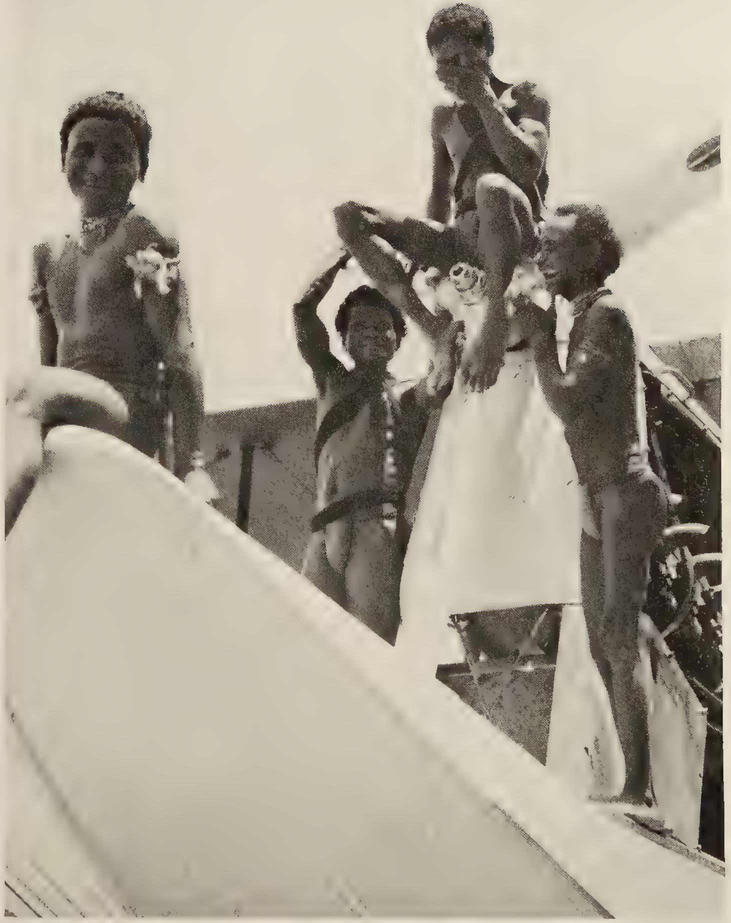
JAPANESE AND FILIPINO FISHERMEN AT APARRI USE ENORMOUS NETS

Here, as in the Dutch East Indies, many of the natives depend upon the sea for livelihood. An outrigger sailing canoe is beached in the right foreground.



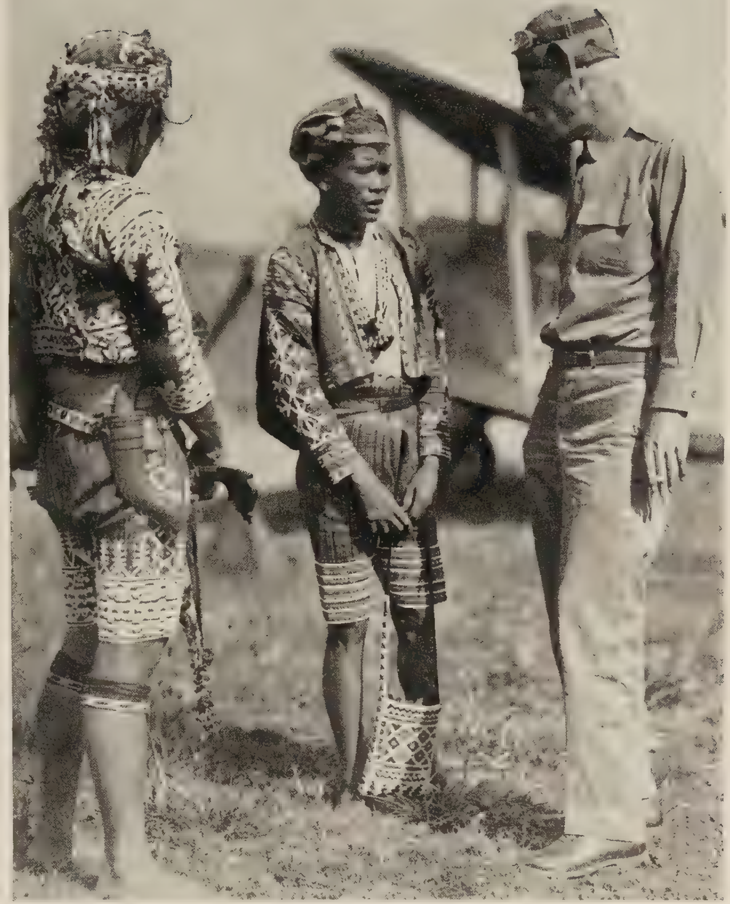
NEGRITOS CARRY THE "DEACON" ASHORE

In one flight at Casiguran Bay, the amphibian plane was brought down on a sandbar, and the natives transported the flyers to land (see text, page 333).



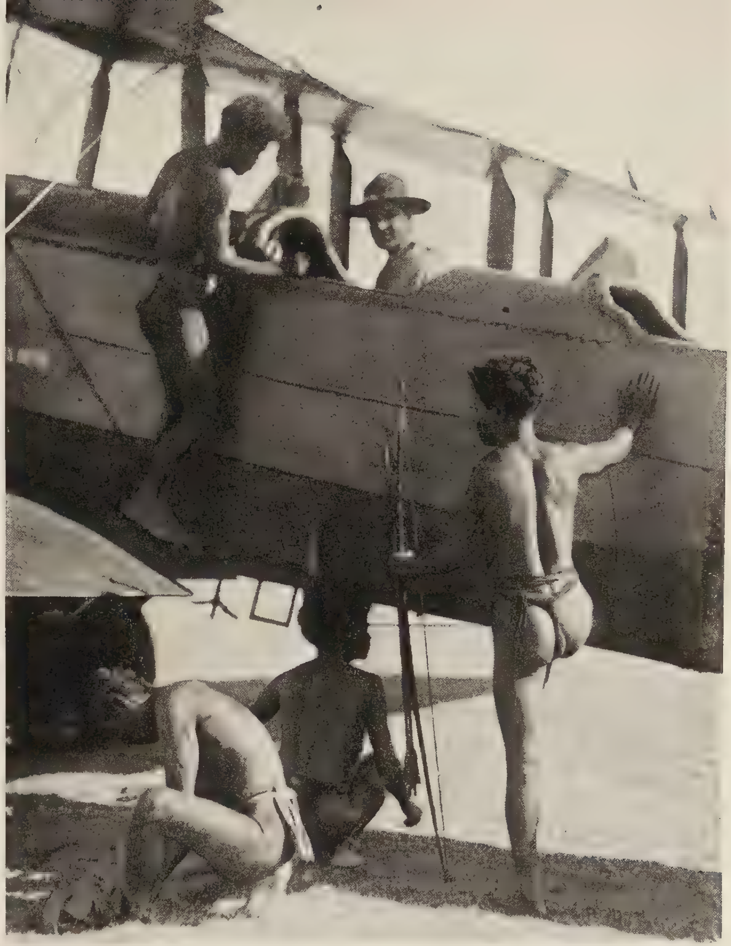
FAMILIARITY DISPELS FEAR

At first the Negritos at Casiguran Bay were afraid of the airplanes, but once convinced of the harmlessness of the "great birds," they clambered all over them (see text, page 330).



PAGAN BAGOBOS WEAR ELABORATE COSTUMES

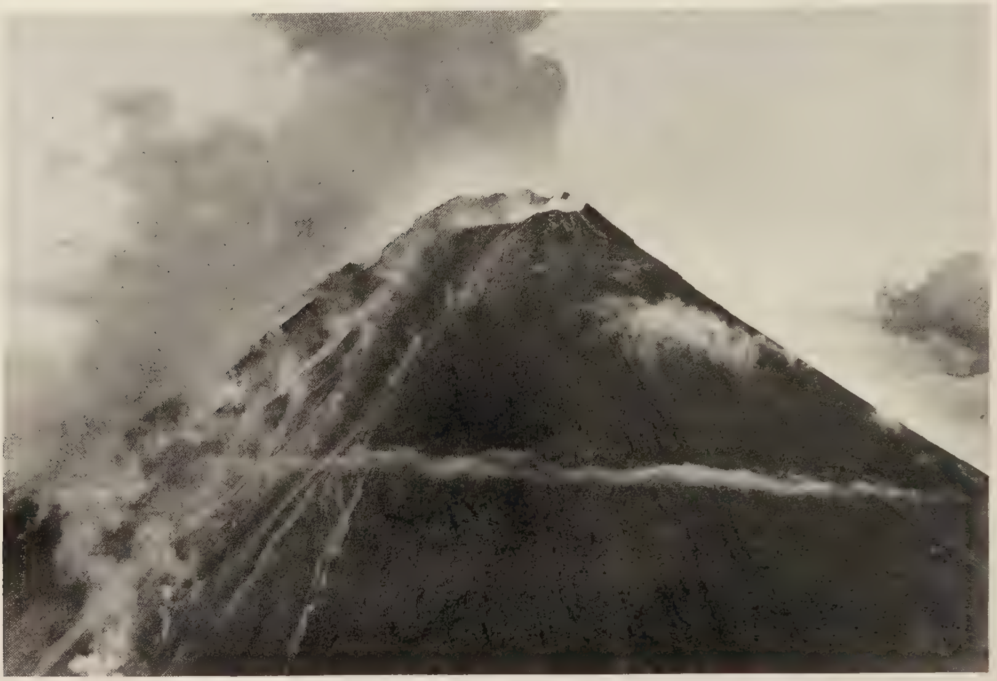
Tie-dyeing, embroidery, and bead work are practiced among these people, some 10,000 of whom live in Mindanao. The jackets and trousers are of woven grass cloth. Major John Duckworth, U. S. Army Medical Corps, is observing these natives' reactions after their first airplane flight.



Photograph by Merle Le Voy

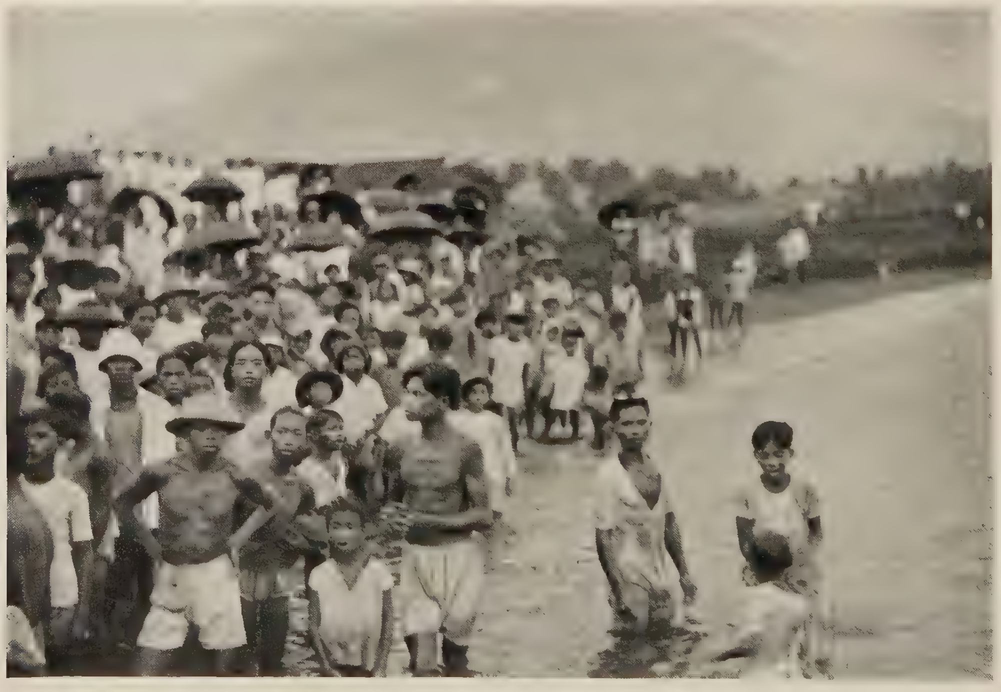
HAVING THEIR FIRST VIEW OF THE "GREAT BIRD"

Negritos of Aparri, believing that the plane is some sort of fowl, are examining it for traces of feathers and other attributes of winged creatures. They cannot be convinced that the landing wheels are not a species of claw (see text, page 334).



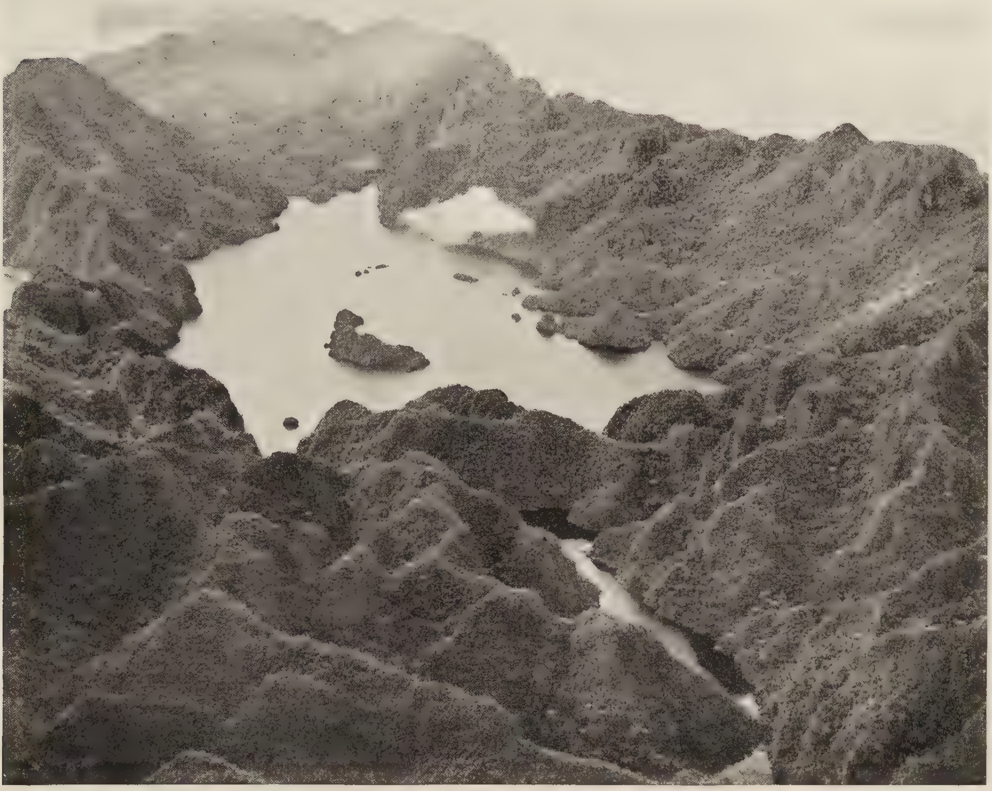
FLYING OVER MAYON VOLCANO IN ERUPTION PROVED A DANGEROUS UNDERTAKING

The author and Lieutenant Corkille had some exciting adventures in the tricky air currents above the crater (see text, page 319). They took this photograph early on a July morning.



RIVERS OF MOLTEN LAVA DROVE TERRIFIED NATIVES BEFORE THEM

When the Army relief plane reached Legaspi beach the aviators were met by throngs of refugees from the slopes of Mayon Volcano, the cone of which can be seen in the background.



U. S. Navy Photograph

CORON ISLAND IS A RING OF VOLCANIC ROCK AROUND A SMALL LAKE

Such formations are common in the Philippines. Because of the lack of safe areas for landing on the ground the flyers were obliged to use amphibian planes for much of their work.

The natives advised us to start out early in the morning if we contemplated taking pictures, because the clouds usually hid the volcano shortly after six o'clock. We were off at 5:00 o'clock and at 5:30, before the sun had appeared from behind the distant clouds, the motion and still pictures were being taken. Unfortunately, the volcano was passing through a quiet period, and did not present the sight we had seen the previous afternoon and evening.

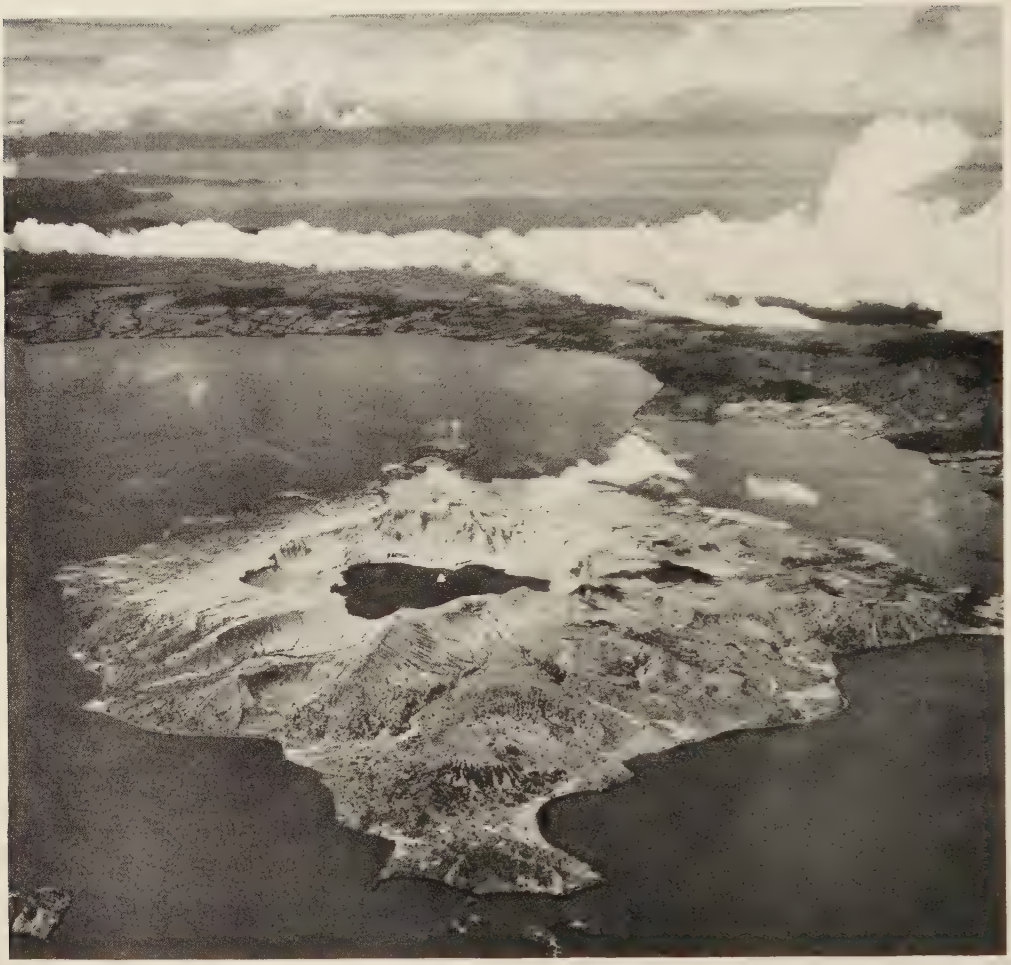
All of our photographs were taken shortly after six o'clock, and so we continued into Manila, where the pictures were printed and delivered to the newspapers and bureaus concerned.

FIGHTING LOCUSTS IN THE AIR

It seemed that whenever I went out and encountered something worth telling about, the Deacon came in with something just a little better. On one occasion he had lost himself and didn't show up until about half an hour after I had landed. While I was waiting for him, I noticed what looked like a great dark cloud moving in from the jungle area. It was an enormous swarm of locusts, attracted by our field—the only green place for miles around. In some years, before and during the rainy season in the Philippines, locusts are a great pest, doing incalculable harm to agricultural lands (see p. 334).

This cloud of insects kept coming toward the field and hovered over it, darkening the sky. Just then I heard the hum of the Deacon's motor.

He said afterward that he couldn't make out, squinting down out of the cockpit, what in the world was the matter with the field. It looked like heat waves from up



TAAL VOLCANO, WHICH KILLED 1,400 PERSONS IN 1911, NOW LIES QUIET

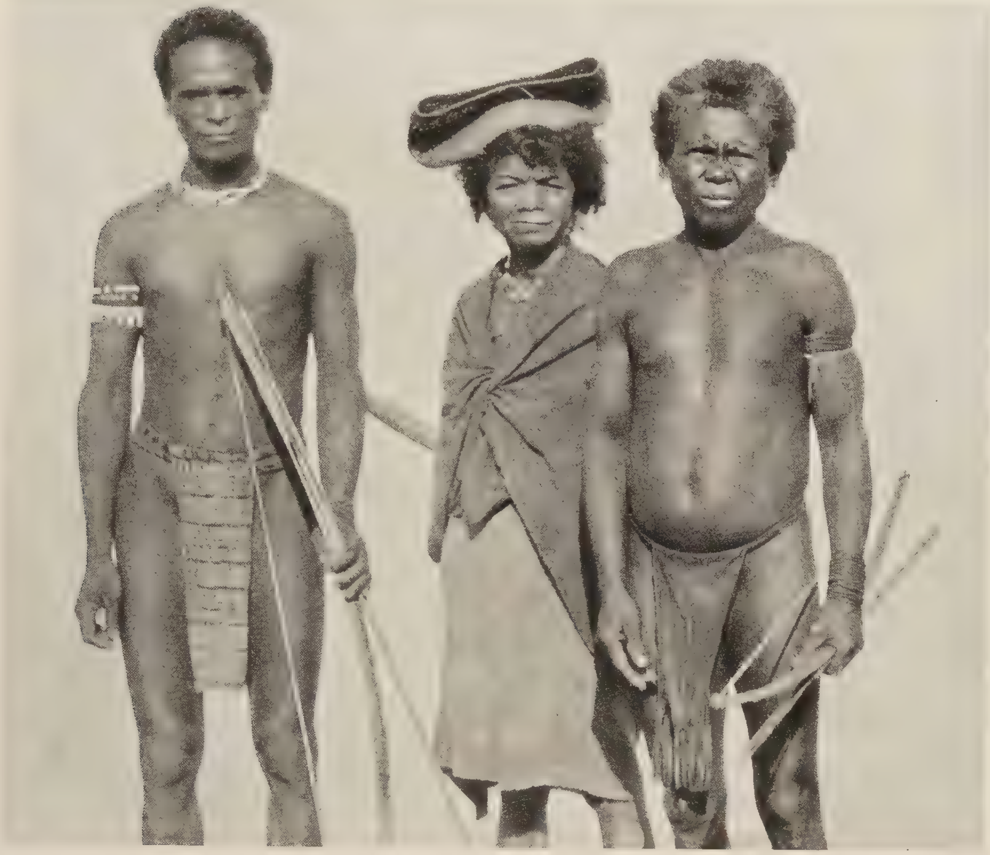
This sleeping dragon is on an island in Bombón Lake, only 39 miles from Manila (see "Taal Volcano and Its Recent Destructive Eruption," by Dean C. Worcester, in the NATIONAL GEOGRAPHIC MAGAZINE for April, 1912).

above, he said. When he came down close and saw what it was, he decided to fly into it. He made the biggest mistake of his flying career, right there. The locusts simply plastered the ship—flattened out all over it.

The Deacon's goggles were so splashed he couldn't see. The insects got into his mouth, nose, and ears. He zoomed up out of the danger zone instinctively and retreated to the sky to do some heavy figuring. Our landing field was the only place in northern Luzon where he could come down safely. He circled around for half an hour until finally the locusts settled down over the field and he could land.

It's an ill wind that blows nobody good. Our hazards provided a banquet for residents of the place. They came out with big baskets and gathered locusts to their hearts' content. Locusts are considered a great delicacy by some Filipino tribes, who pull the wings off and fry them.

Much the same thing had happened once when we were mapping the Bataan Peninsula (see text, page 311), only with bats instead of locusts. There is an extinct volcano in the area. We were flying very low trying to get pictures of it when an immense horde of bats, startled, I suppose, by the sound of the motor, came pouring out of rock crevices. They plas-



TWO DOLLARS A MONTH MAKE THE PRESIDENTE'S FAMILY PLUTOCRATS

The old headman of a Negrito village on Casiguran Bay receives a salary of 48 pesos a year for keeping his people under control. With such riches at her command, his wife is the best-dressed woman in the neighborhood. The couple's son acts as chief of staff.

tered the ship in much the same manner as did the locusts, only a little more solidly. On landing at the field we found one monster bat embedded in the shutters of our radiator, with his wings folded around the edges of it. His wingspread was nearly four feet.

NEGRITOS FLOCK TO SEE "BIG WHITE BIRD"

We spent about two weeks at the Aparri base, completing the territory we had planned to map on the northern end of the unexplored strip, then returned to Manila for a new amphibian plane more suitable for the work, and safer. It had just arrived from the United States on the transport *Grant,* and was a Loening amphibian of the type flown by the Hon. F. Trubee Davison, Assistant Secretary of War, and Maj. Gen. James E. Fechet, Chief of Air Corps, to France Field, in the Canal Zone.

Starting out again one morning, heavily loaded, with two seaplanes from Corregidor as escorts, we made the 200 miles northeast from Manila to Casiguran Bay, on the southern edge of the unexplored area, in short order. Now we were living on the very edge of the area over which we had flown before, and had a good chance to observe the wild Negrito tribes.

Before starting to work again we made one trip inland on foot to seek prospects for a landing field up near the lava beds that surround the course of a river emptying into the sea. We gained some idea of what a forced landing would mean in this region.

In Casiguran Bay, we were tied up to the *Fathomer,* U. S. Coast and Geodetic

Photograph by Raymond Stockwell

THRONGS OF CURIOUS NATIVES WERE ATTRACTED TO SAN JOSÉ FLYING FIELD

Living in the dense forests of Mindoro, the Mangyans have had virtually no contact with white civilization. Their swiftest way of sending news from village to village is by beating on tree trunks, and naturally the space-devouring airplane proved a wonder of wonders to them. In many of the settlements both men and women go nearly naked, save for the gee string. The author's feminine visitors on this occasion are wearing far more than the traditional tribal costume.

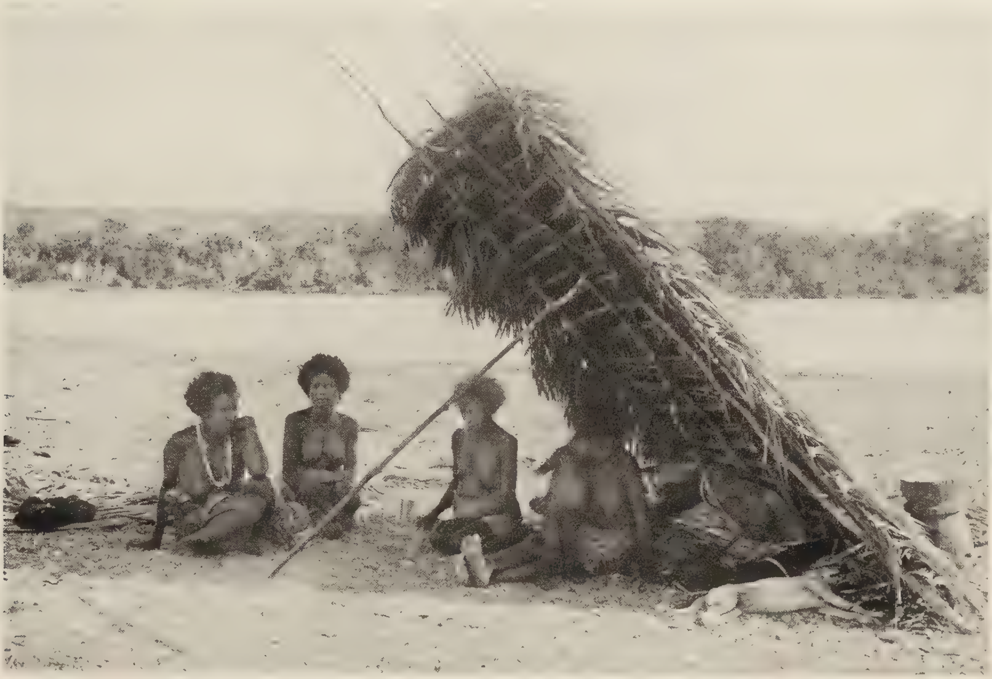
Survey boat, which had been dispatched to this point with our gasoline and supplies. Wells and I, with Capt. G. C. Jones, of the *Fathomer,* made the trip inland, flying up the coast to the nearest approach and taxiing up onto the beach. The point we had sighted appeared to be only a short distance away, but it took an hour or more of extremely hard work to get there. We had to cut our way through tough, thick cogon grass, and had to climb trees frequently to get our direction. We saw many deer and wild pigs, but found no place that would make a decent landing field.

One of the most interesting features of the expedition was our relations with the Negrito visitors, who swarmed about the planes whenever we taxied ashore. They were frightened at first, remaining in the background behind trees and bamboo groves. But they soon discovered that the "big white bird" was not harmful, and they made the most of our visit.

THE BIGGEST EVENT OF A GENERATION

It was just like a "world's fair" to them, the biggest event of a generation. They came from miles and miles around, bringing offerings of bananas, coconuts, lemons, and papayas. In exchange, we gave them empty five-gallon gasoline cans, which they use for water cans, and no offering could have pleased them more. They hugged those cans, carried them around for days, slept with them. We could have had in exchange anything we could carry back.

The *presidente,* a wizened old fellow with sharp eyes, and his wife and daughter were our most distinguished hosts. The presidente receives four pesos, or $2



VENTILATION PRESENTS NO PROBLEM IN NEGRITO ARCHITECTURE

A lean-to, six by eight feet, the size depending on the number, suffices to protect the family from sun and wind (see text, page 314).

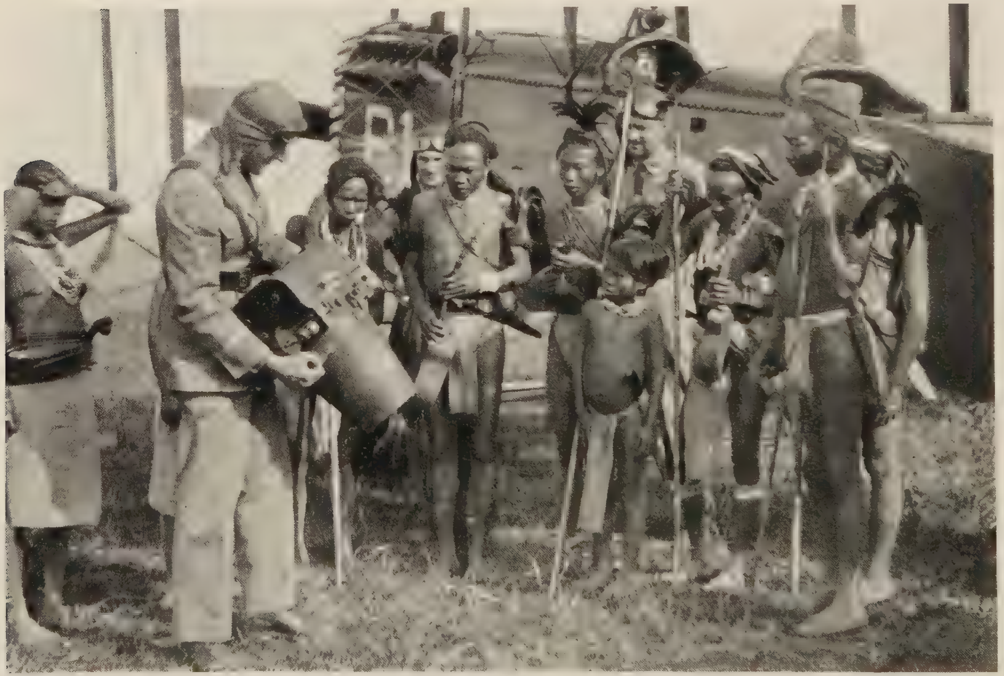
Photograph by Merle Le Voy

THOUGH SLOW, THE CARABAO RACE OFFERS A THRILLING FINISH

After all, it is the contest rather than mere speed that delights the crowd. Natives at San José, watching these evenly matched water buffaloes lumber down the stretch to the frantic urging of their owner riders, are as much excited as partisan spectators at the Derby.

BARBECUED WILD PIG REWARDS THE HUNTSMEN

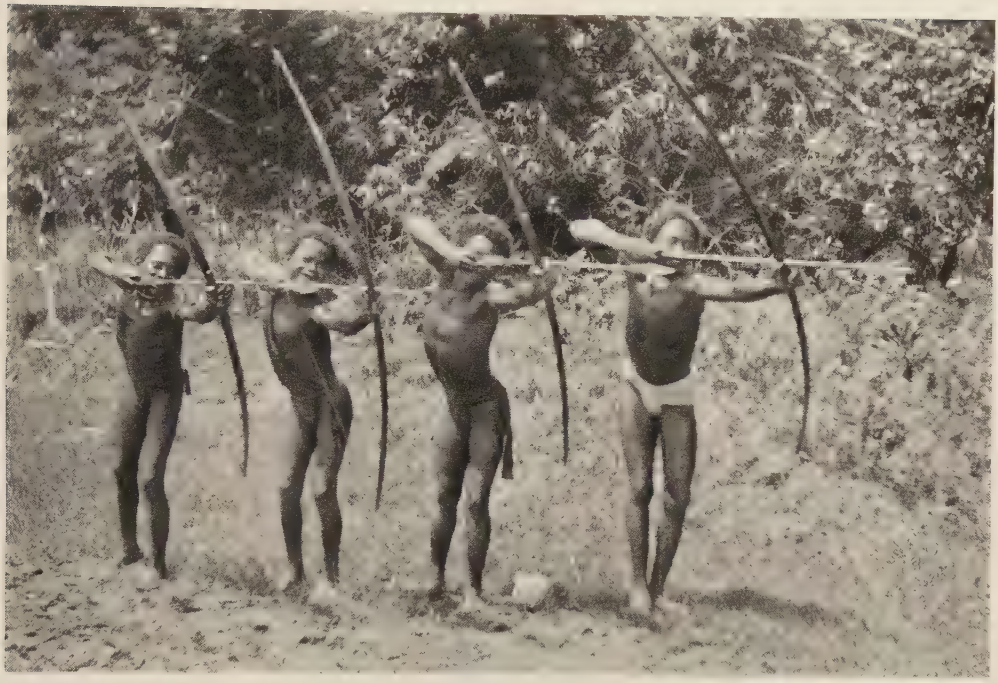
The evening after an exciting chase is a festive occasion at Casiguran Bay.



Photograph by Merle Le Voy

WONDERS OF MODERN SCIENCE SEEM SUPERNATURAL TO THE MANGYANS

On being shown the air camera by the author, a group of primitive hill people gazed at the device in awe. Their own civilization is so backward that they have no weapons save bows and arrows, and indicate numbers above three by tying knots in strips of rattan. It is said that a few of them can count as high as 20 by using toes and fingers.



Photograph by Raymond Stockwell

NEGRITOS, YOUNG AND OLD, ARE SHARPSHOOTERS WITH BOW AND ARROW

While at Casiguran Bay, the flyers were entertained by a remarkable exhibition of native marksmanship (see text below).

in gold, per month from the Philippine Government for keeping his tribe in order, and is rich beyond the comprehension of his subjects. But our empty gasoline tins started a new vogue in tropical currency. Madame Presidente put most of her husband's salary on her back, judging from appearances. She was the best-dressed woman of all the tribe. But she could no more resist the tremendous appeal of an empty gasoline tin than could the most lowly tribesman. She carried hers around with her for three days, and slept with it, like the rest.

The largest Negrito village in the region was on the south edge of the area we were working, not far from where the Coast Survey cutter lay. We landed there for a visit, but could not taxi up on the beach. The sand was too soft. The natives came out and carried us ashore on their shoulders, and stayed to talk for hours. We traded oil tins for bows and arrows and other trinkets. When it was time to leave, half the village waded out to the plane and put their shoulders under it to get it back in the water. We flew around them and performed some stunts to repay them for helping us off the sandbar.

A CLEAN, FRIENDLY PEOPLE

These natives, a clean, friendly people, practice modes of self-decoration that are typical of South Sea islanders. They cut designs on their bodies in childhood, using for the purpose pieces of broken bottles or sharp shells and rubbing dirt in the wounds to make them fester and leave welts. They slit their ears, especially the women, and leave the lobes hanging to their shoulders, stuffed with cigarettes, perfumery, and other objects they want to carry around with them. They chew betel nut, and usually carry the paraphernalia in the ears. Instead of filing their teeth down to sharp points as many wild people do, they file them flush with the gums, so that they look like a toothless race; but some of the younger members have fine sets of white teeth.

Young and old are expert with the bow and arrow. At one village we were entertained with a remarkable exhibition of

Photograph by Merle Le Voy

FLIGHTS OF LOCUSTS SOMETIMES DIM THE SKY AT APARRI

To the flyer attempting to make a landing such clouds of insects present a dangerous hazard (see text, page 327).

prowess. Coconuts were placed on a pole, as a target, and the marksmen split them with amazing frequency. A few blowguns with poisoned arrows are used for hunting and for tribal warfare, but these Negritos are generally peaceful.

They were crazy to fly. As white men, we ourselves were objects of curiosity, but the planes came in for special tribal adulation and wonder. Whenever they could get our attention they tapped themselves on the chest and pointed to the sky with a beseeching look.

I am sure they attached some supernatural significance to the "big white bird." They never discarded the notion that the plane was a species of fowl. Some of the crew on the Survey boat, who have been charting the coast for years, understood enough of their language to learn that the natives had decided that the wheels, which drew up under the pontoons, were birds' claws. One old fellow spent hours squatting in front of the plane, trying to make his arms go around like the propeller. If he could once get the hang of it, perhaps he might fly by himself!

The plane was undoubtedly "good medicine." All who could crowd close enough to it touched and fondled the wing surfaces and fuselage. Becoming bolder, they climbed all over it and into it. At night they went to sleep on the sands close by, with oil cans for pillows.

AMERICANS SEEM ALL-POWERFUL

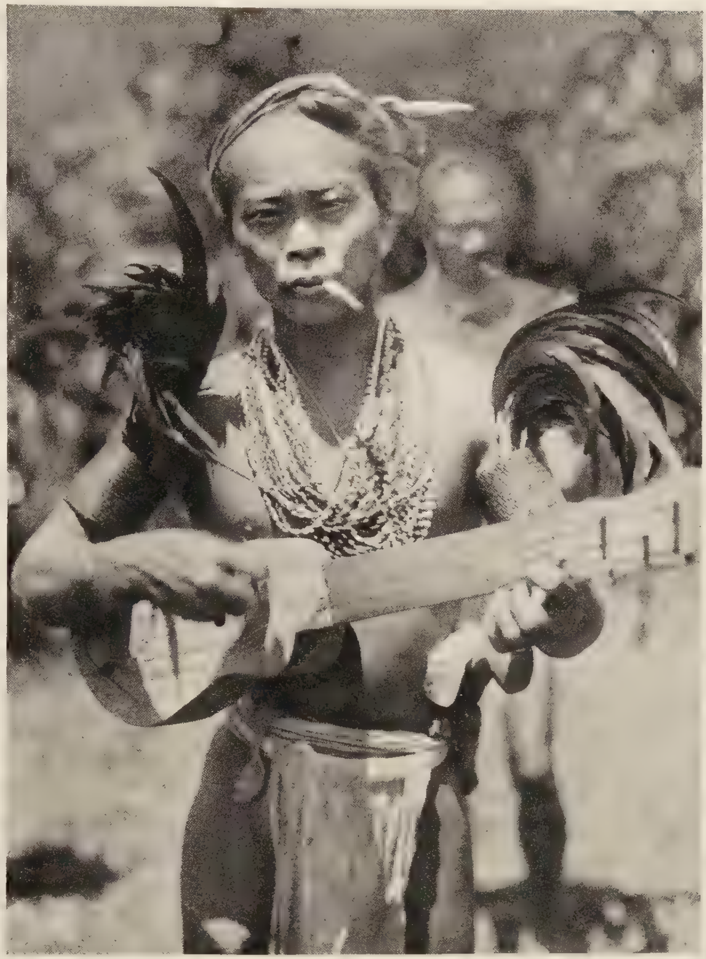
The presidente wanted to know how big the stars and the moon looked when we went up in the plane at night. I have had Americans living in our own country ask me the same thing.

A very amusing incident happened one evening when, unannounced, we ignited a piece of an obsolete airplane flare which produced about 500,000 candlepower. The light, which was located at the edge of their settlement, gave the natives quite a scare and practically all of them took off for the mountains. We learned later that they thought their god, which is the moon, had fallen to the earth and was about to punish them.

The next morning runners carried the news that the "Americano" had caused the light and that everything was all right.

They immediately returned and requested that we repeat the spectacle, which we did a few nights later, for their amusement and for motion pictures of their dances. To them, it would seem, the Americano can do anything. They have seen his cigarette lighters, cameras, field glasses, airplanes, have undergone slight operations and been cured by medicine, and so our light business was not so puzzling after all.

We had some sardines, some rice, and a bag of salt that proved very welcome gifts, and some red cloth which we brought along pleased the presidente's daughter beyond words. She allowed us to dress her up in it, and we made her look as much like an American "flapper" as possible. The women hereabout use the sweetest perfume in the world, a kind of herb which they find in the forest, crush and place in the split lobes of their ears, inside cylinders of rolled cloth (see illustration, page 336).



Photograph by Merle Le Voy

HUMAN HAIR SERVES AS STRINGS ON THE MANGYAN UKULELE

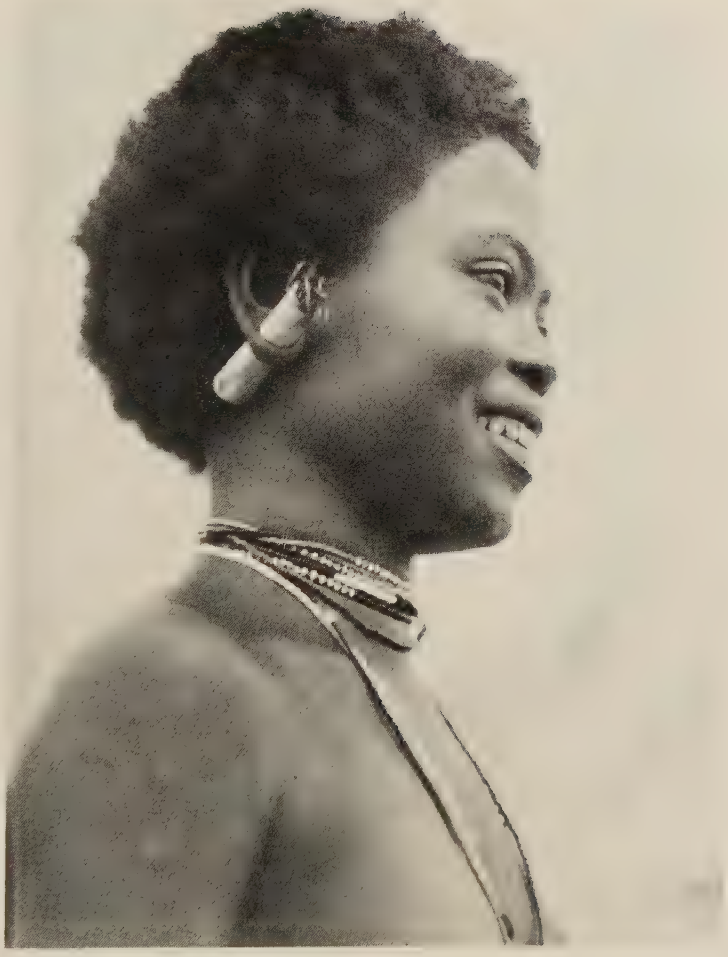
Remarkable natural musicians, the people of this tribe of the forested interior of the island of Mindoro sing to the accompaniment of homemade stringed instruments and bamboo flutes. Their "ear for a tune" is so keen that they can reproduce clearly a melody after hearing it but once.

Our work on the southern edge of our territory was about the same as from the Aparri base. We spent the morning in flying and mapping, and were tired out at the end of four or five hours. The sudden climb from tropical heat to the frigid upper air is debilitating.

SUITS OF SPONGE RUBBER WORN

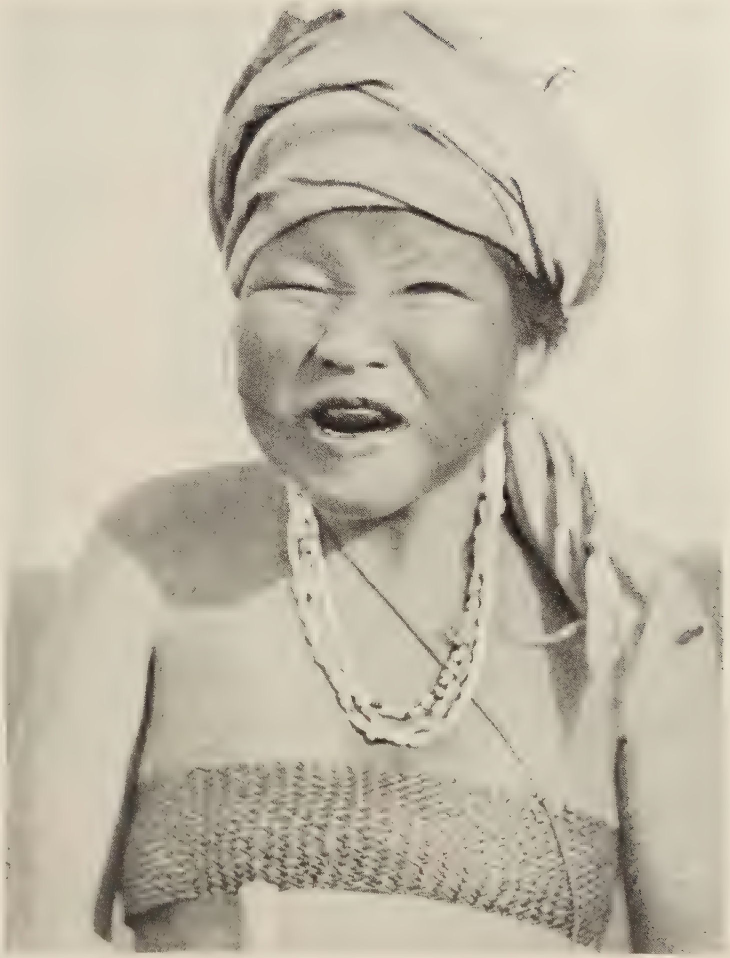
We wore suits of sponge rubber which were unbearably hot on the ground, but we needed all the protection we could get from the cold at the 12,000-foot level. Everything, including ourselves, sweated copiously on the descent. The camera equipment in the planes got as wet as if we had been parked out in a rainstorm. It was a problem to keep the film dry under these conditions.

Flying close over the forests, the noise of our motors would arouse thousands of birds and animals. Monkeys abound, and their chatter is added to the cries of birds and the noise of insects. With more altitude, the trees, which average about 100 feet in height, take on the aspect of a vast green cauliflower, so close together are they.



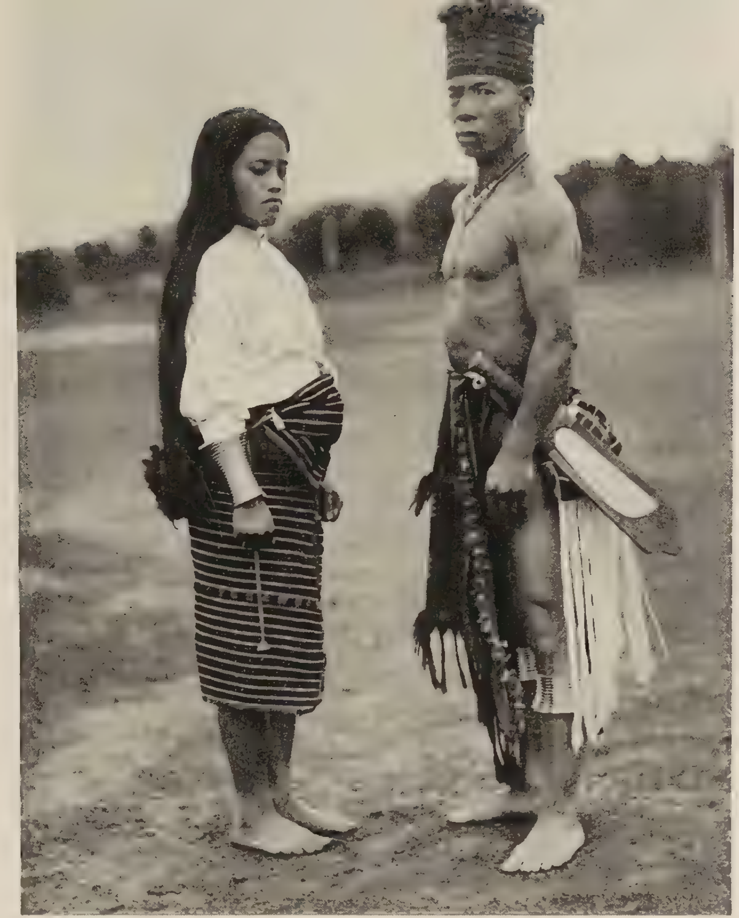
SHE CARRIES HER PERFUME IN HER EAR

A Negrito girl of Casiguran Bay gives a demonstration of the use to which a perforated ear lobe can be put in the Philippines. The powerful essence to which she is especially partial is made from a crushed forest herb (see text, page 335).



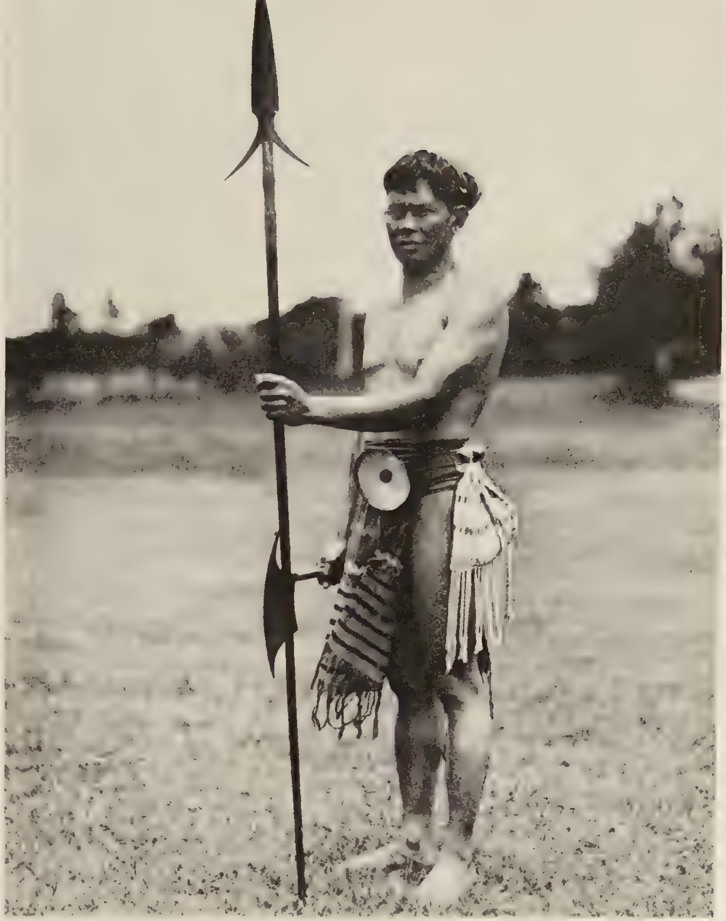
STYLES CAUSE THE MANGYAN WOMAN NO ANXIETY

Her attire is simple; a cloth turban, a woven bandeau, a short skirt, and a few beads suffice. In outlying villages the costume often consists of nothing more than a gee string. Both men and women of her tribe wear their hair long and file their teeth to the gums.



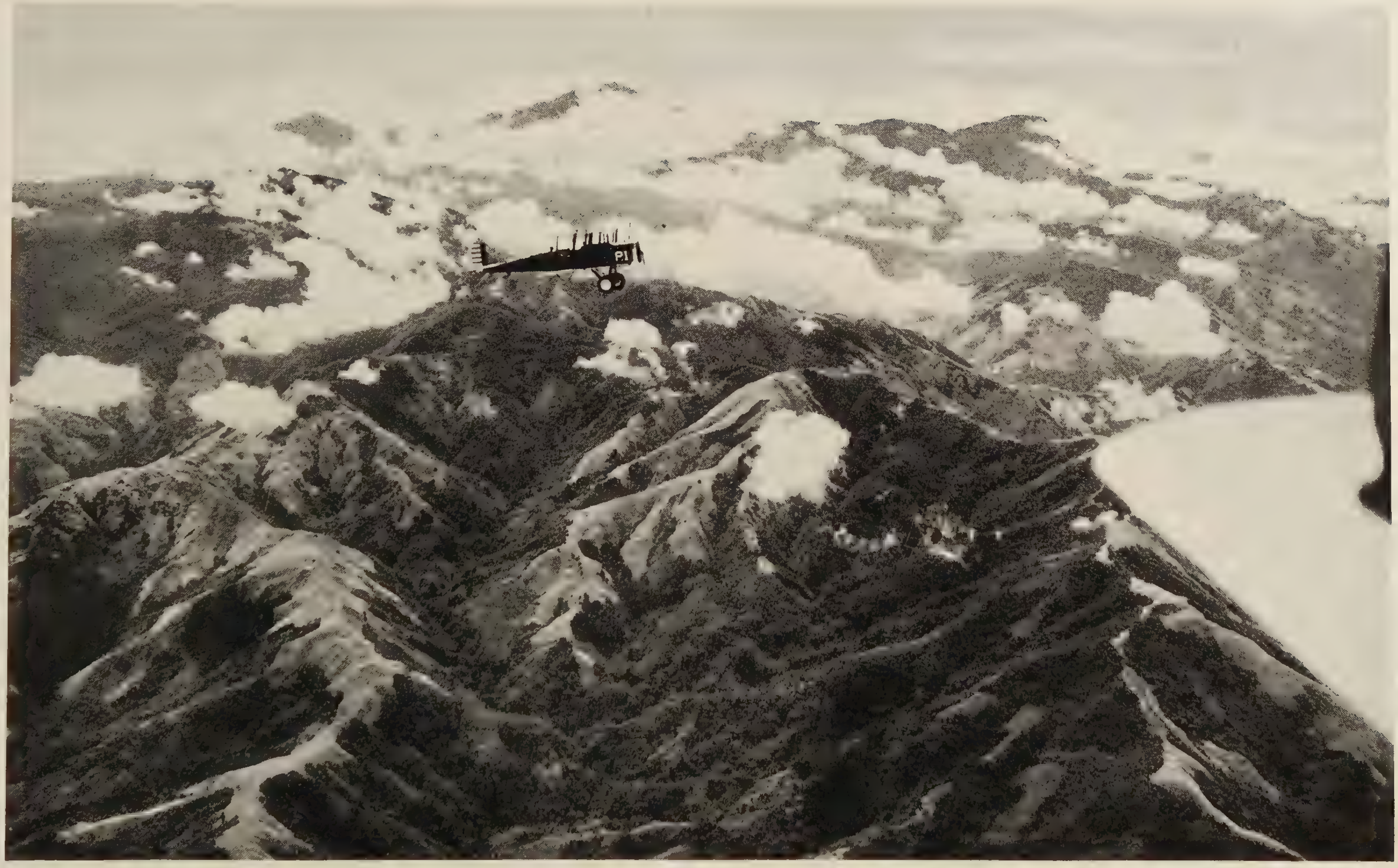
IFUGAOS HAVE DEVELOPED AN EXCEPTIONAL CULTURE

These pagan tribesmen, builders of most of the mountain rice terraces, are distinguished for extraordinary industry (see illustration, page 322). They have a 13-month calendar, kept by the clan wise man, who begins his reckoning about mid-July by tying a knot in a string. For every succeeding day a knot is made until the number totals 28. A new cord is then started for the next month.



ONCE THE HEAD AX AND SPEAR HAD DEADLY SIGNIFICANCE

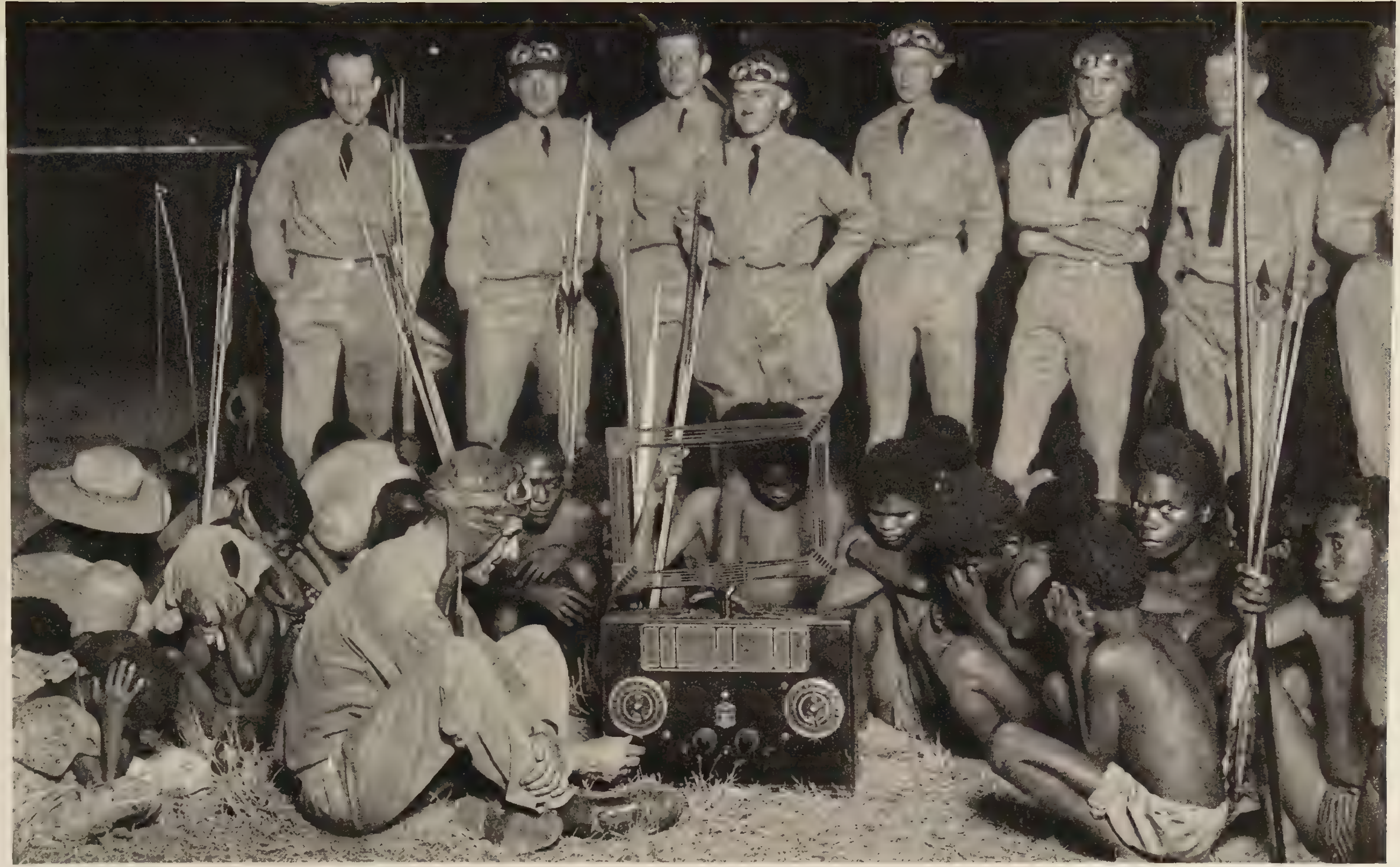
Pagans of northern Luzon are referred to in the census of 1903 as *Igorots,* but the term means merely *mountain people,* and is not the name of a tribe. Groups included in the classification are the Bontocs, Kankanai, and Nabaloi. This man is equipped with the weapons that played a gruesome part in the feuds between the clans before American occupation.



Photograph from Lieut. G. W. Goddard

MANY FLIGHTS WERE MADE OVER AREAS NEVER BEFORE SEEN BY WHITE MEN

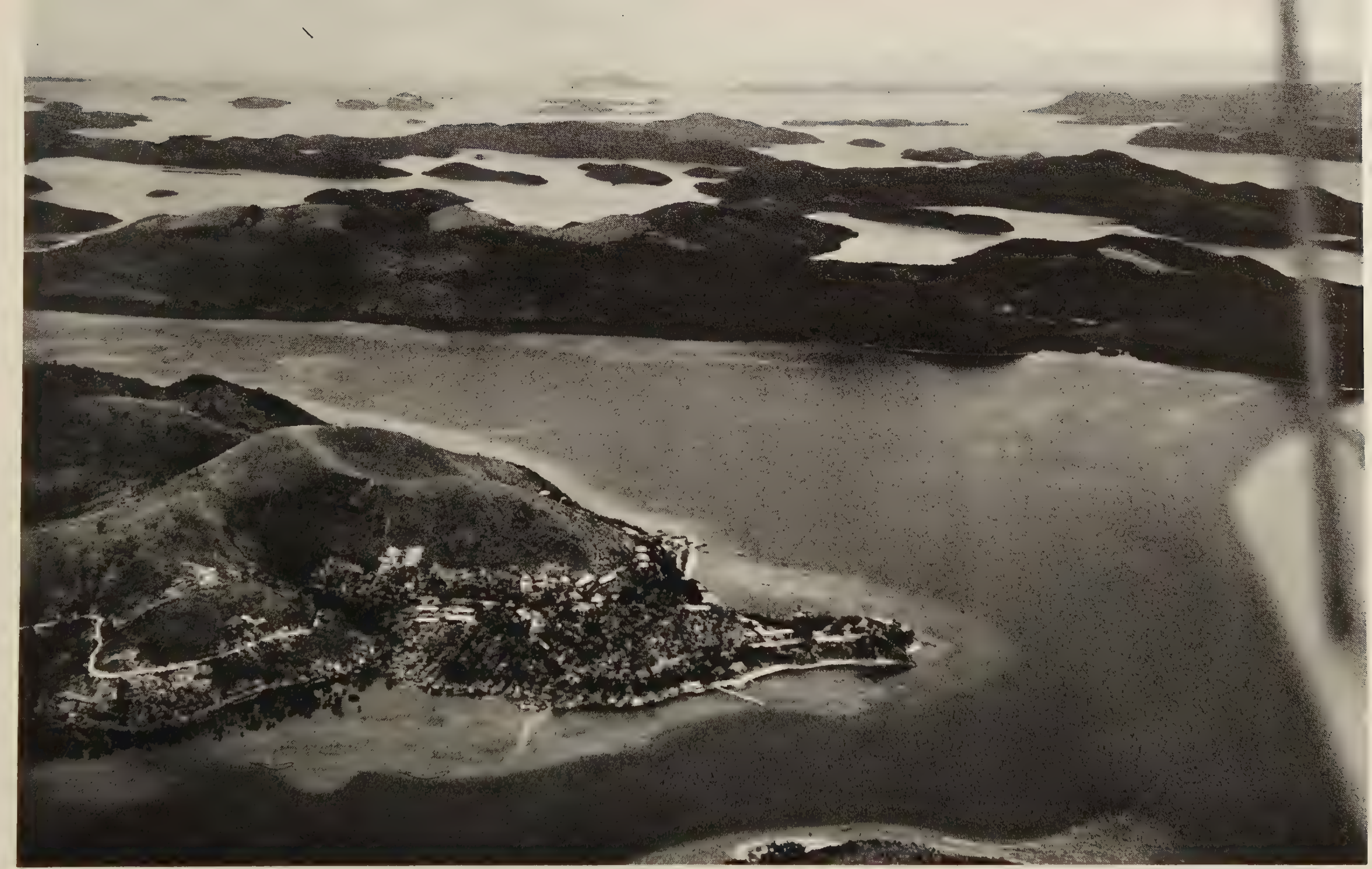
In northeastern Luzon lie mountain fastnesses which, until the coming of the mapping expedition, were among the earth's blind spots (see text, page 311). Grass covers these rugged peaks above the timberline. The plane in the background is that piloted by Lieutenant Wells, "the Deacon."



Photograph by Raymond Stockwell

FROM NOWHERE COMES A VOICE THAT TERRIFIES THE SIMPLE NATIVES

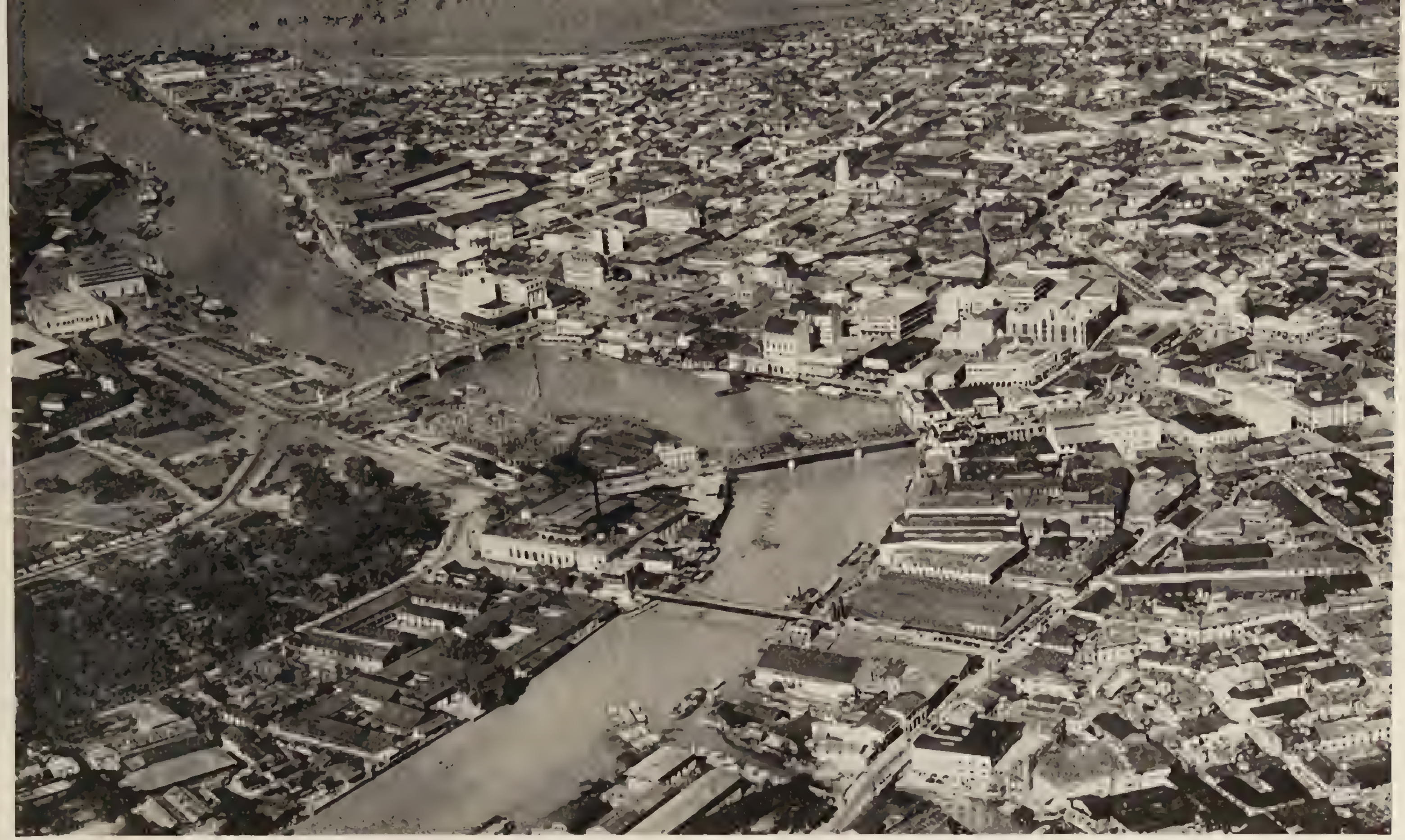
Tuning in on Manila for the Negritos' first radio concert, the author produces an effect on his audience that combines pleasure, fear, and fascination, registered by clasped ears and covered faces.



U. S. Navy Photograph

A FEW OF THE 7,000 ISLANDS OF THE PHILIPPINE ARCHIPELAGO SEEN FROM THE AIR

This view, near Bilaa Point on the north coast of Mindanao, is characteristic of the Far East insular possession of the United States. Mindanao, in the southern half of the archipelago, is second in size to Luzon, having an area about equal to the State of Indiana.



MODERN MANILA, FROM AN ELEVATION OF 3,000 FEET

On the banks of the Pasig River, in the left foreground, is the Sternberg Hospital, adjacent to the City Ice Plant (with the tall smokestack). The new Post Office, under construction, on the same side of the river, is seen in the middle distance. The second bridge is the Santa Ana, with the handsome new Jones Bridge further downstream. On the left bank, near the bay, is the U. S. Army headquarters of the commanding general; offshore, to its right, is a Japanese fishing fleet.

Photograph by Merle Le Voy

FUEL FOR MODERN TRANSPORTATION COMES BY PRIMITIVE MEANS

It is a far cry from the cart drawn by the water buffalo to the great plane that sweeps through the heavens, yet without the one the other would be helpless in northeastern Luzon.

The waterfall we discovered was a considerable distance inland, on the course of the largest river that crosses the area. It is visible from only one angle, so dense is the growth around it, and it was by accident that we made the discovery. We flew close enough to get some good photographs of it, adding this tangible bit of information to the lore of the untouched Philippines (see page 310).

We were forced one day to land in the swells along the coast when the water jacket in our amphibian sprang a leak, and we had a better idea after that of what it would have meant to try them in a land plane. It took some careful handling to set the plane down in them. When we finally settled, they lifted us 10 to 15 feet in the air at a toss, then let us down in the hollows with a sickening drop.

Just before coming down we had seen a 9- or 10-foot shark close to the surface. This was none too reassuring. Examination revealed that we had enough water in the radiators to get us back to the Survey cutter, so we took off again, taking advantage of a strong wind.

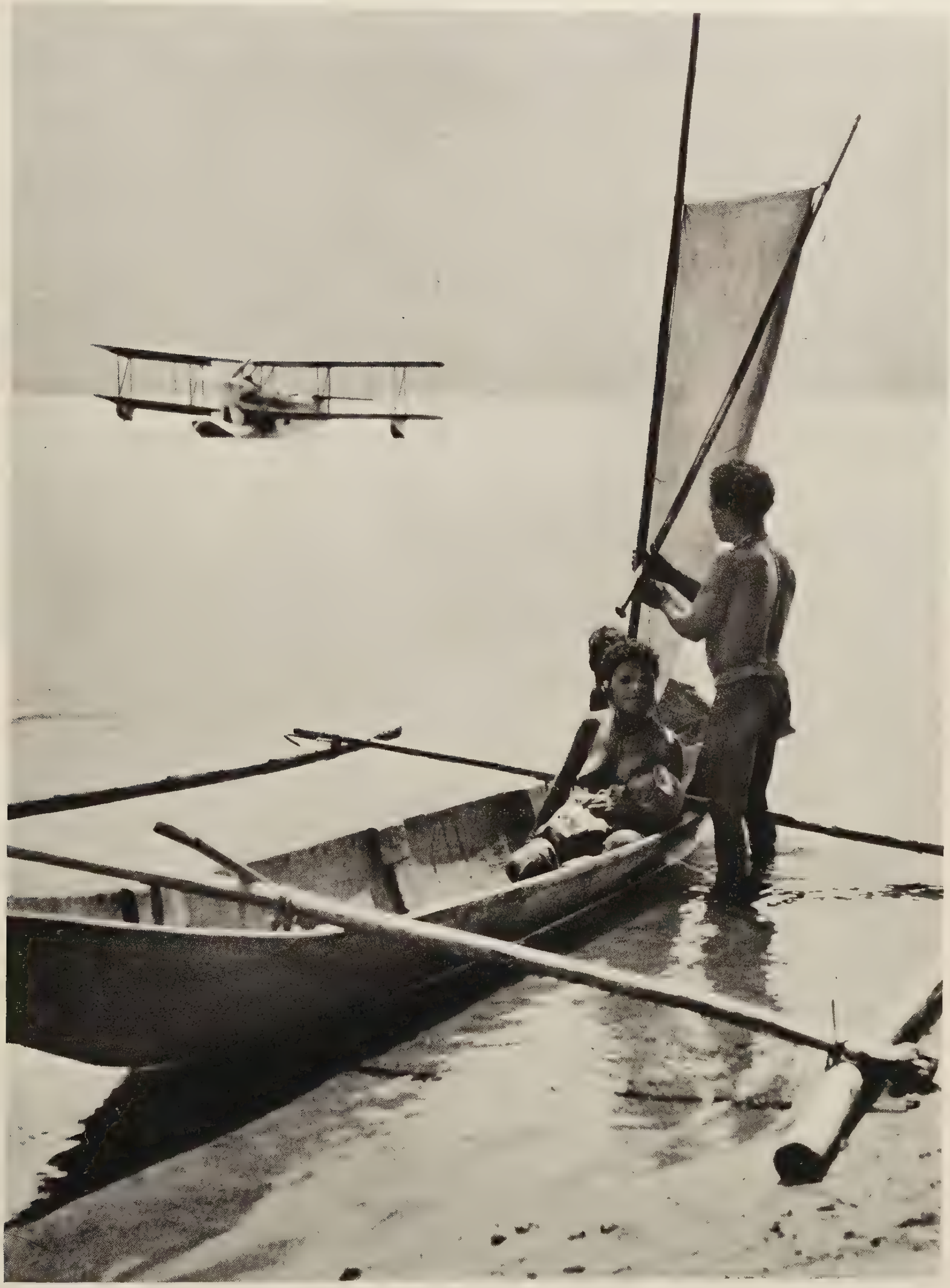
We also had another forced landing on the way down the coast toward home after we had completed the job. One of the escort ships lost a spark plug and descended to install a new one. The Deacon couldn't resist taking a swim, despite the sharks, but when he ran into a five-foot sea turtle he scrambled out in a hurry.

The results of the trip, taken as a whole, were very encouraging from several points of view. Our photographs, taken in one month, covered practically 5,000 square miles and saved the U. S. Coast and Geodetic Survey, the Philippine Forestry Bureau, and Bureau of Lands an enormous amount of time on their preliminary survey work.

These photographs show sufficient detail on which to base valuable Government reports. Even the underwater detail to a depth of 20 feet is shown in certain localities along the coast line.

There is power in the rivers, timber on the surface, rich soil for cultivation, and resources under the soil in the area over which we flew.

Besides all this, our trip proved again that the airplane is invaluable in tropical exploration.



IN CASIGURAN BAY THE AMPHIBIAN HAD PRIMITIVE HARBOR MATES

Centuries of progress separate the natives' outrigger sailing canoe and the modern seaplane, yet the eye of fancy can detect a strange resemblance between them.

THE COLOR CAMERA'S FIRST AËRIAL SUCCESS

By Melville Bell Grosvenor

With Illustrations from Natural-color Photographs by the Author

IT WAS indeed a red-letter day in world progress when, in 1829, the two Frenchmen, Daguerre and Niepce, combined their researches in chemistry and the camera, out of which emerged the daguerreotype. Down the milestones of a hundred years from that day, the brains of unnumbered students of photographic science have labored and traveled to perfect and simplify the need of mankind for faithful imagery, and thus create a language that is to-day more universally understood than any sounds formed by the human voice.

No single man may claim to be the discoverer of photography. It was the outgrowth of theories born of early alchemists and chemists who turned their stumbling steps toward the study of the action of light. Out of such research evolved the science of photochemistry.

The fundamentals of the camera were known as far back as the twelfth century. Even the great inventor and artist, Leonardo da Vinci, who was born in 1452, described and left among his papers the theory of a camera obscura. In 1568 Barbaro suggested convex lenses and a crude diaphragm by which a sharper image might be obtained.

But whereas pioneer experimenters of the Middle Ages groped laboriously forward, recording progress through slow decades and centuries, the modern development and refinement of the camera and the photograph—the stereoscopic camera, the motion picture, the natural-color photograph, the aërial photograph, the microphotograph, the X-ray photograph, the sound picture—have all come within the memory of living men.

COLOR PHOTOGRAPHS FROM EARTH, SEA, AND SKY

Of equal importance and value in the dissemination of knowledge through photographic records has been the contemporary development of photo-engraving, by means of which the details of a photograph may be transferred to the printed page, both in black and white and in color, and thus less expensively multiplied by the million. The educational value of this achievement is priceless.

In pursuing its mission—the increase and diffusion of geographic knowledge—the National Geographic Society, through its official journal, the NATIONAL GEOGRAPHIC MAGAZINE, has made the photographic illustration its handmaiden. For more than 30 years The Magazine's pages have been enriched by the contributions of photographers from all parts of the earth, even from the floor of the sea and, more recently, from the skies above.

Members of The Society will recall that the first natural-color photographs to be made of under-sea life were reproduced in their Magazine,* and that the first series of natural-color photographs of the Arctic regions were also made by The Society's staff photographers for these pages.† Now come the first successful natural-color photographs made from the skies.

NEWLY DEVELOPED PLATE MAKES AËRIAL COLOR PHOTOGRAPHY POSSIBLE

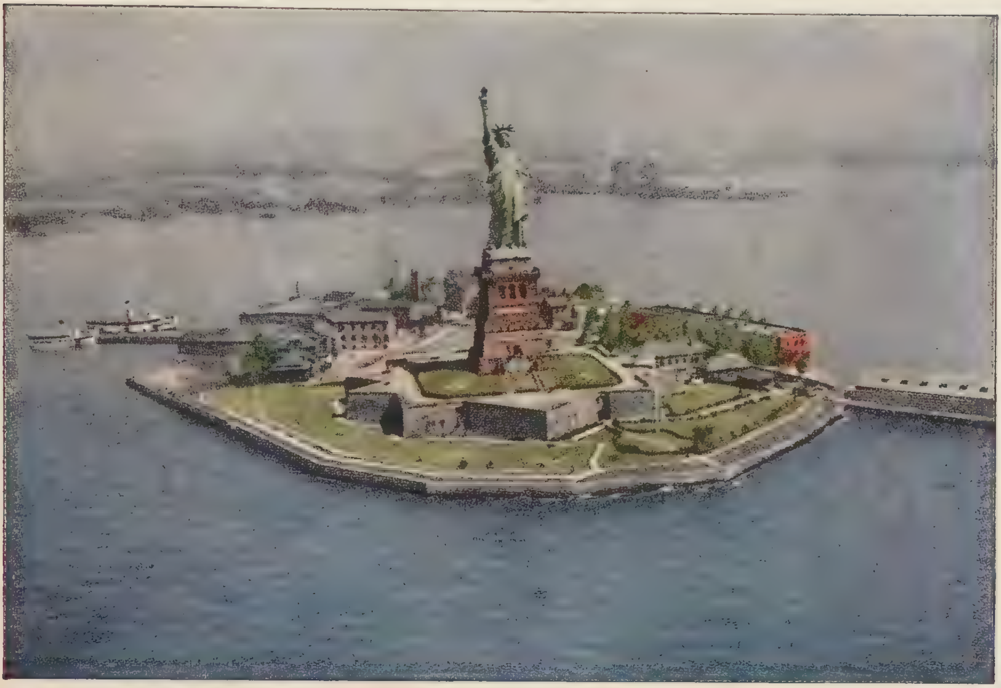
Aërial color photography has perhaps been previously attempted, but heretofore it has been impossible to overcome the primary difficulty, namely, that natural-color plates require from fifty to sixty times the length of exposure to light necessary for black-and-white pictures. With such a time handicap, successful color photographs from swiftly moving airplanes and from wind-tossed lighter-than-air craft have been impossible.

Recently, however, a new method of natural-color photography has been developed abroad, and the National Geographic Society sent Mr. Charles Martin, the chief of its photographic laboratories, to study this and other processes. The new plates

---

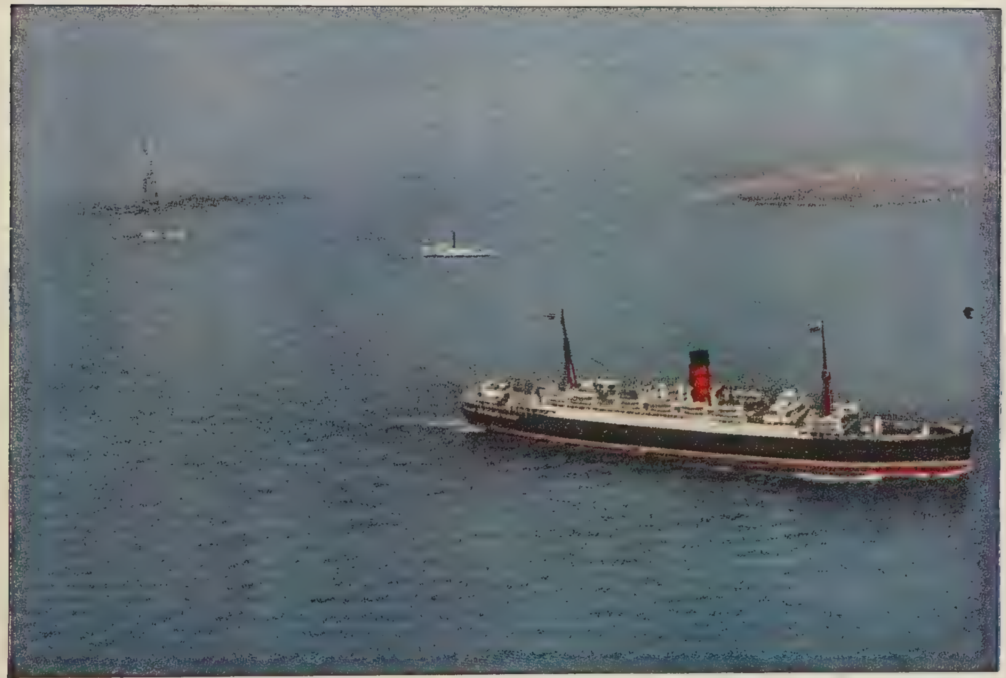
*See "First Autochromes from the Ocean Bottom: Marine Life Along the Florida Keys Is Successfully Photographed in Colors," by W. H. Longley and Charles Martin, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1927.

† See "First Natural-Color Photographs from the Arctic," in the NATIONAL GEOGRAPHIC MAGAZINE for March, 1926.



MISS AMERICA POSES FOR HER FIRST AËRIAL PORTRAIT IN COLOR

The Navy Airship *ZMC 2* on its way to New York saluted the Statue of Liberty by dipping to 300 feet.

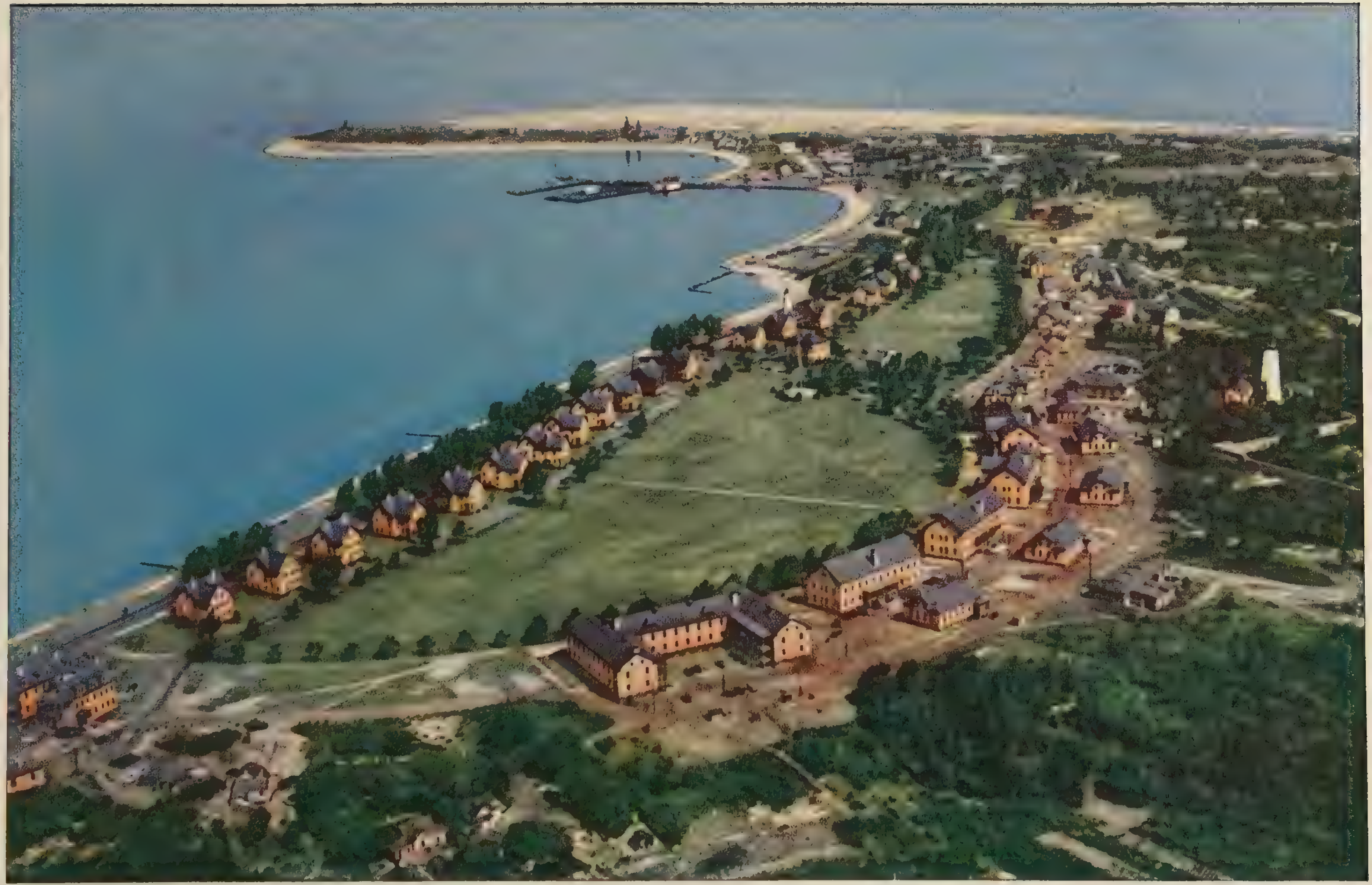


© National Geographic Society

Finlay Direct-Color Photograph

THE "LANCASTRIA" INWARD BOUND TO HER NEW YORK BERTH

A fine haze, spreading like a thin veil between the airship and the water, dims the Statue of Liberty and Ellis Island in the distance.

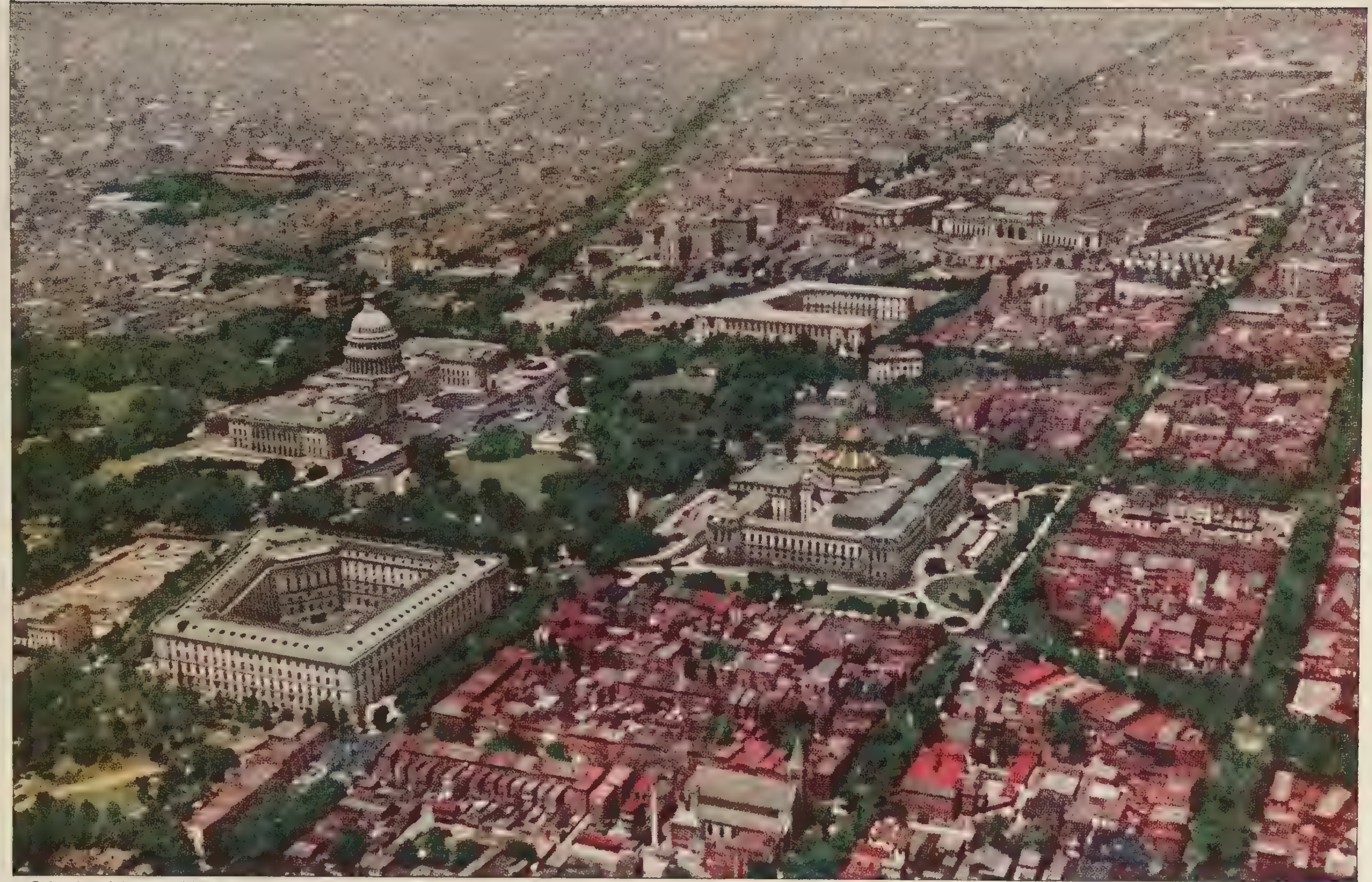


© National Geographic Society

Finlay Direct-Color Photograph

SANDY HOOK'S FLAT TONGUE OF SAND PROTECTS THE NARROWS OF NEW YORK HARBOR

Fort Hancock, the principal feature of this famous spit pock-marked with gun emplacements ancient and modern, is one of the land defenses of America's metropolis. The white lighthouse, a familiar landmark to mariners since 1764, is the oldest standing light tower in the United States.

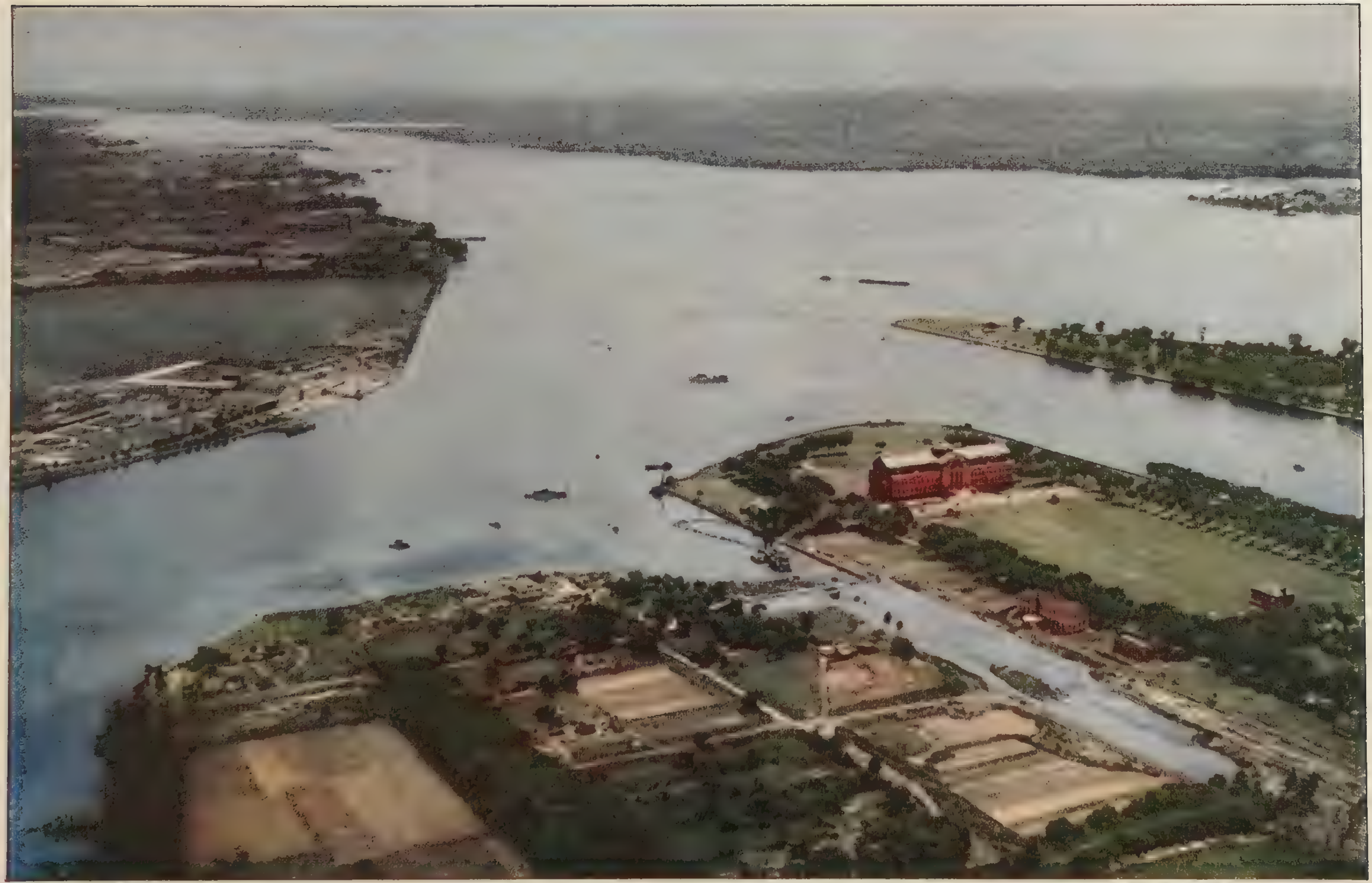


© National Geographic Society

Finlay Direct-Color Photograph

THE HEART OF THE NATION'S CAPITAL IS THE SUBJECT FOR THE FIRST SUCCESSFUL NATURAL-COLOR PHOTOGRAPH FROM THE AIR

The domed Capitol is flanked by the House and Senate Office Buildings, with the Library of Congress in the central foreground. The Folger Shakespearean Library is under construction at the right. In the plot to the left of the House Office Building (foreground) will rise the new House Office Annex and to the north of the Library of Congress, facing the Capitol, the new Supreme Court Building is to be erected.

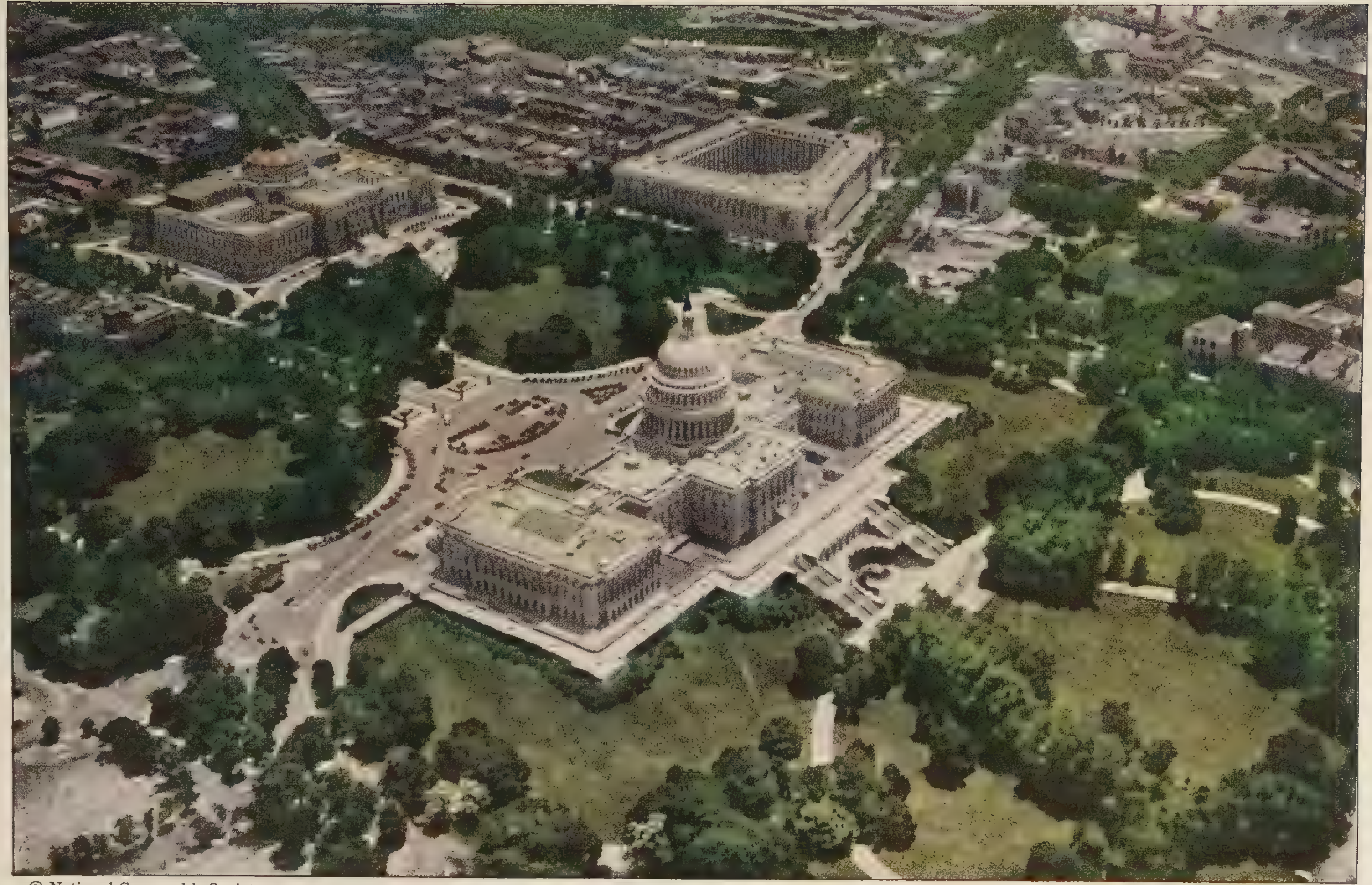


© National Geographic Society

Finlay Direct-Color Photograph

THE BROAD EXPANSE OF THE POTOMAC AT ITS JUNCTION WITH THE ANACOSTIA RIVER

Up the Potomac's 24-foot dredged channel from Chesapeake Bay and the Atlantic come vessels as large as the U. S. Cruiser *Memphis*, which brought Colonel Lindbergh home from Paris. Anacostia Naval Air Station, where many world air records have been set, is seen at the mouth of the Anacostia River on the left. The Army War College, with its tree-lined campus, rises on the middle peninsula in the right foreground between the now abandoned James Creek Canal and the Washington Channel. Hains Point, bordered by the Potomac Park speedway, is next.

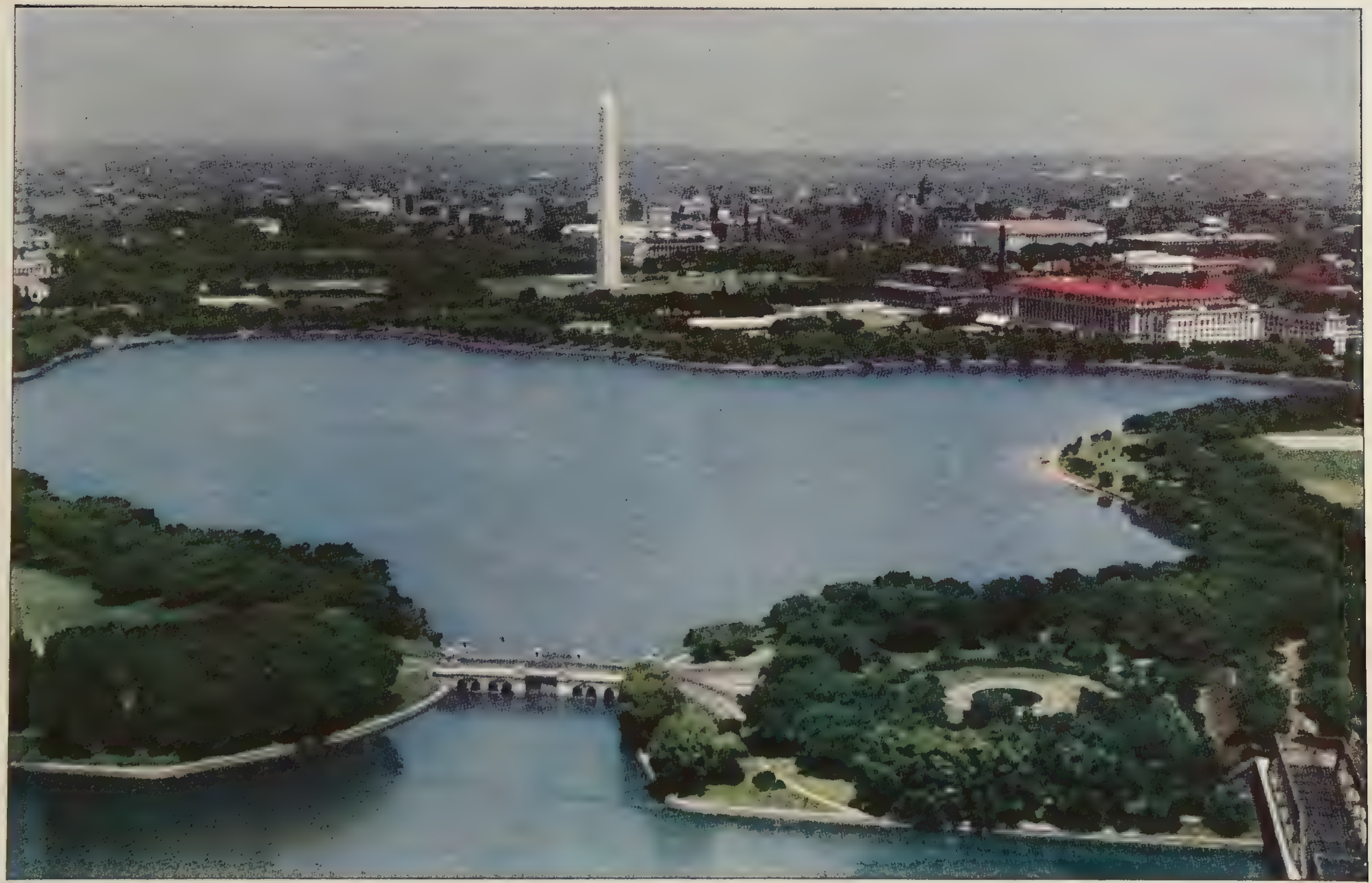


© National Geographic Society

Finlay Direct-Color Photograph

AT AN ELEVATION OF 1,200 FEET THE NATION'S CAPITOL RESEMBLES A GREAT WHITE BANQUET CAKE

The grounds surrounding this magnificent structure, especially in the lower left toward the Union Station, are at present being developed by landscape artists under the direction of the National Commission of Fine Arts (see, also, Color Plate III).

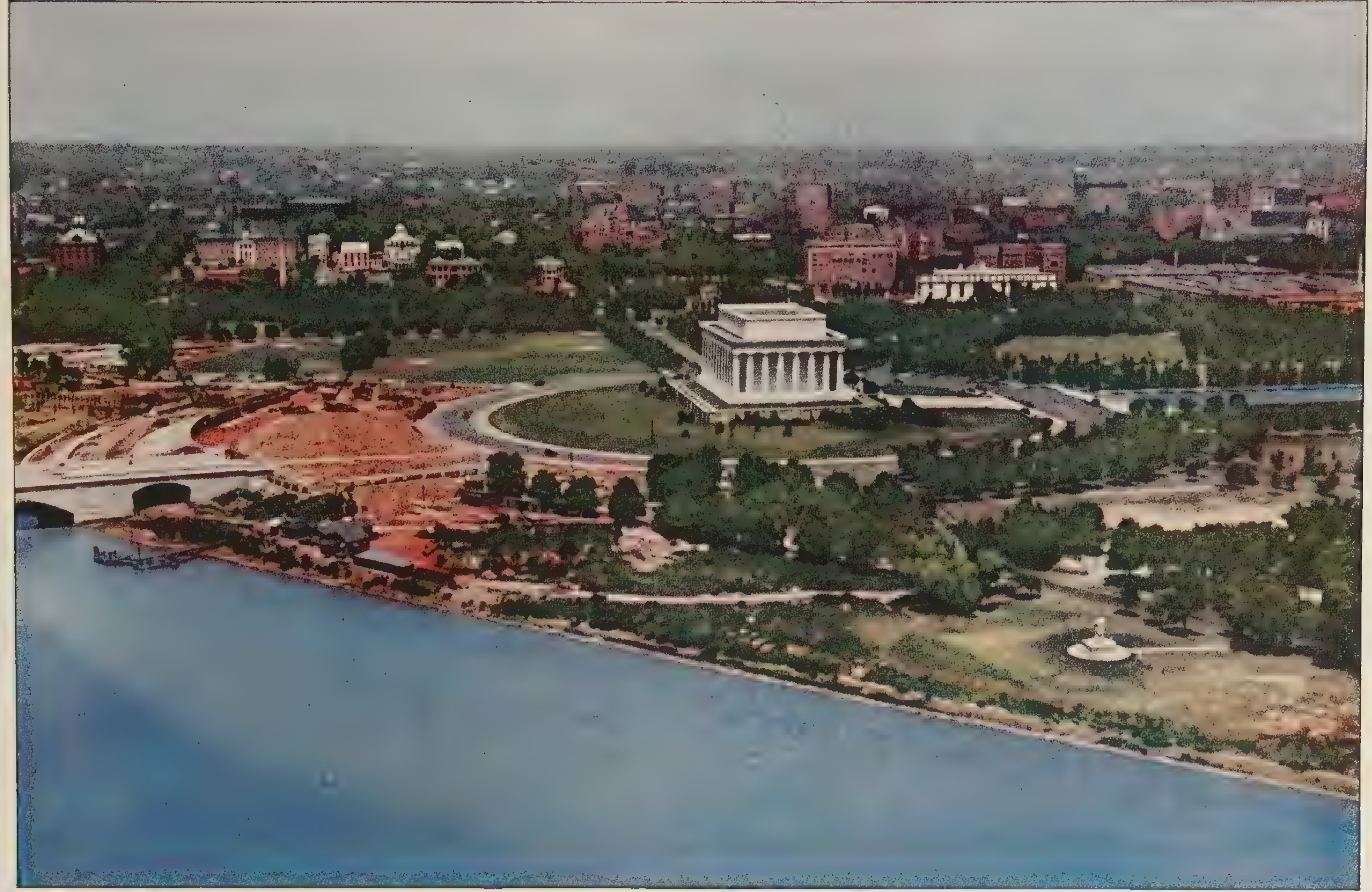


© National Geographic Society

Finlay Direct-Color Photograph

THE MOST FAMOUS MONUMENT OF THE NEW WORLD VIEWED FROM ALOFT THROUGH THE LENS OF A COLOR CAMERA

Visitors come from every State in the Union in April to view the blooming of the Japanese cherry trees which encircle this tidal basin. The White House, flanked by the State, War, and Navy, and Treasury Buildings, is seen through the trees at the left. Behind the Monument is the new Commerce Department Building, which, when completed, will be the largest in Washington. At the right is the Bureau of Engraving and Printing.

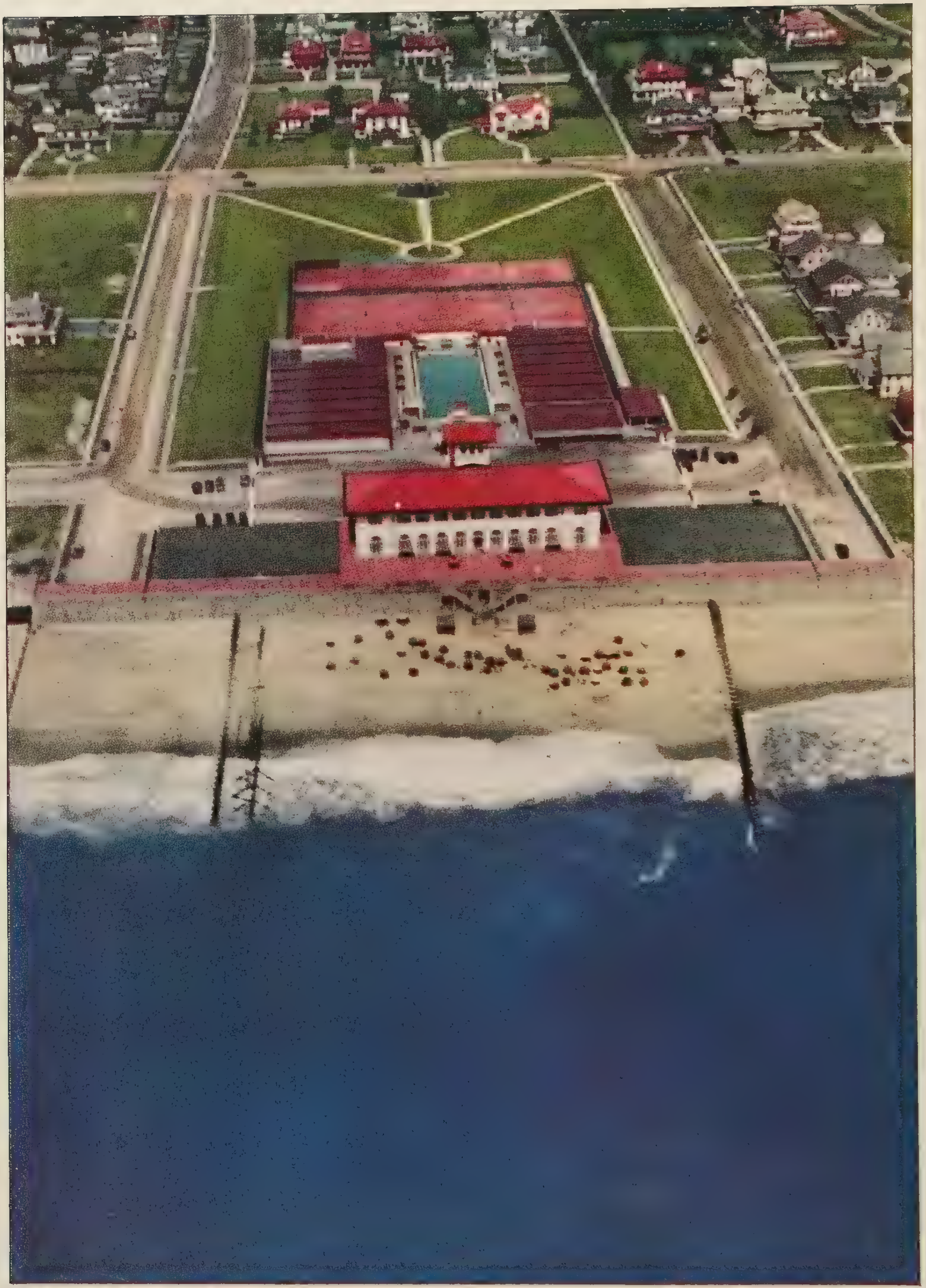


© National Geographic Society

Finlay Direct-Color Photograph

A PERPETUAL SHRINE OF BEAUTY: THE LINCOLN MEMORIAL

When the Arlington Memorial Bridge is dedicated in George Washington's bicentennial year, the Mall, extending from the Capitol to the Lincoln Memorial, will be directly connected with the Arlington Amphitheater and National Cemetery. The group of buildings in the left background houses the United States Naval Hospital; the white structure to the right is the National Academy of Sciences. The monument in the lower right foreground is in memory of John Ericsson, inventor of the *Monitor*, famous in American naval history.



© National Geographic Society

Finlay Direct-Color Photograph

A BATHING CLUB NEAR ASBURY PARK, NEW JERSEY, REFLECTS A KALEIDOSCOPE OF COLOR TO THE AËRIAL CAMERA

The National Geographic Society's pioneer experiments in aërial color photography are expected to be of value to the map maker and highway engineer. By means of the correct rendering of color values, camouflaged objects and natural features not apparent in the ordinary black and white photograph are made clear.

brought home by the chief technician, while not as yet sufficiently sensitive to make color pictures from swiftly moving airplanes, have been adapted for use from a dirigible, and the accompanying nine illustrations are presented as examples of a pioneer experiment and will, it is hoped, as in the case of the sea-floor studies, attract the interested attention of students of photography everywhere.

The photographs were made by the writer during a series of flights in the Goodyear-Zeppelin dirigible *Mayflower* and the U. S. Navy's new all-metal *ZMC-2*. Both airships were generously made available to the National Geographic Society for this important experimental work. The Navy's Bureau of Aëronautics was especially anxious to further the effort to make successful natural-color air photographs because of their potential value in the study of camouflaged areas, ships, and gun emplacements.

IDEAL WEATHER CONDITIONS SOUGHT

Ideal weather conditions were sought in order to make these first pictures, and numerous difficulties were encountered before brilliant light and a comparatively calm and hazeless atmosphere came in conjunction.

The first successful natural-color photograph made was of the National Capitol, reproduced on Plate III. When the photographer was in position for the proper composition, the pilot in charge of the *Mayflower* was given a signal, the motors were momentarily cut off to eliminate vibration, and the big bag floated quietly while the brief exposure was made.

Frequently the photographic voyages consisted of shadow-chasing, the pilot and the photographer estimating when a certain scene below would emerge into bright sunlight and then navigating the airship into correct position, so that, with engines silenced, it would attain equilibrium at the right moment. Sometimes, after scurrying over Washington at express-train speed, the ship would arrive at the desired spot just in time to have a wisp of cloud form between the scene and the sun, and thus make the attempt futile.

The photographs of the environs of New York and of Asbury Park were made in bright June weather from the cabin of the *ZMC-2*, which operates from the great aëronautical base at Lakehurst, New Jersey. On the way to New York the airship flew over what seemed to be immense patches of parched brown, reminders of the ravage caused by forest fires the year before. Occasionally these seared areas extended as far as the eye could see, with here and there the charred upstanding skeletons of buildings where formerly villages flourished.

As the ship approached the shore line, inlets and landlocked bays resembling large pans of water came into view. Each white sand bar and green patch of seaweed in the shallows was clearly etched upon the landscape.

Not until he travels with possibilities of the natural-color camera in mind does the airman fully appreciate the brilliance and the variety of the kaleidoscope that is constantly passing beneath him. Every wavelet, every bit of greensward, every individual in herds of sheep and cattle, and the red, brown, and green roofs of houses reflect their varied color notes in Nature's magnificent panorama.

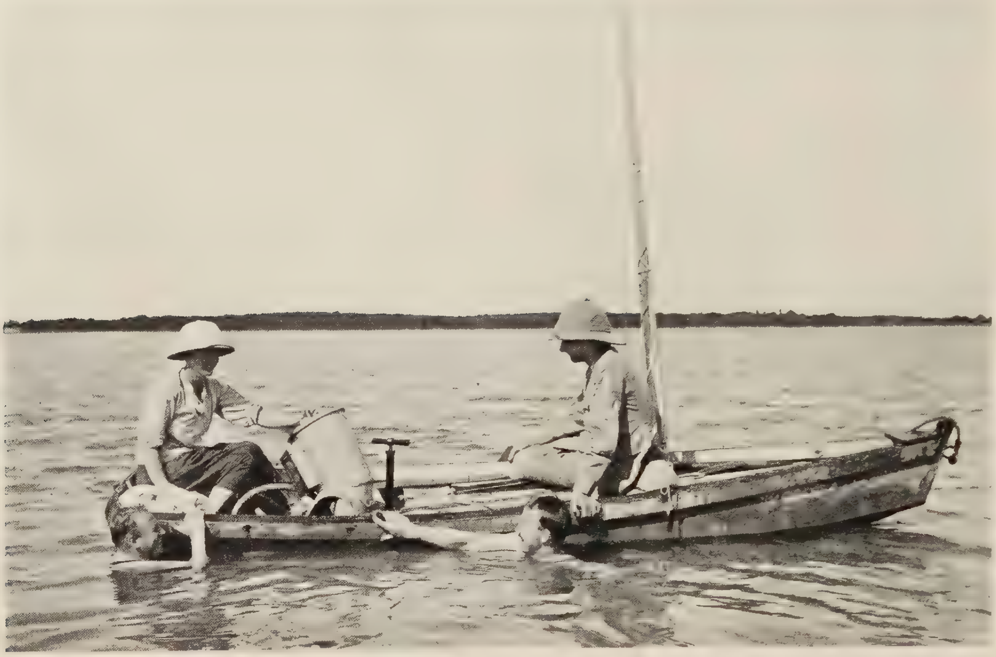
As the all-metal ship flowed along like an ocean liner in a heavy swell, it would skim one moment over some great summer-resort hotel; the next it would delight thousands of interested bathers on the beach; then slip over the slow-rolling blue-and-mottled surf.

NEW YORK HIDES BEHIND A HAZE

Much of Greater New York and its matchless harbor were seen as through a gossamer veil, a condition which the Navy's air skipper assures the writer is frequently encountered.

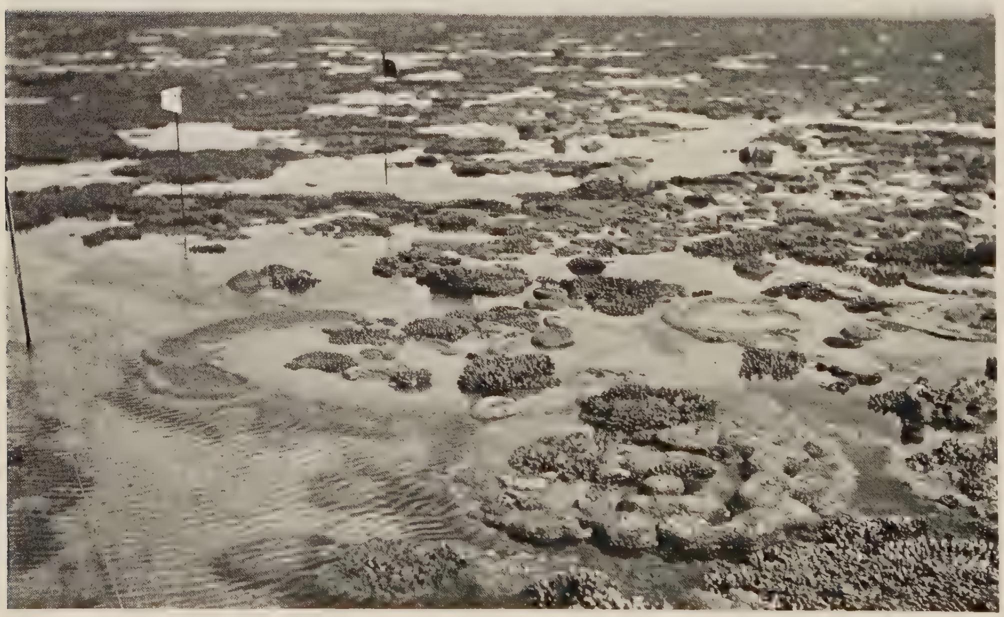
Approaching the earth's surface, the atmosphere contains many almost prismatic tints and shades that cannot be detected by the human eye and, consequently, are hard to believe when recorded on the color-plate through the camera's eye.

With the rapid strides now being made in accelerating the speed of the photographic plate, it is anticipated that these first natural-color air views will be followed in the not-distant future by natural-color scenes made from rapidly moving airplanes, when air currents and a flawless sky will not necessarily determine the subjects for reproduction.



SPYING IN SUBMARINE GARDENS OF THE GREAT BARRIER REEF

The diving helmet was used by scientists at Low Island for observations among the coral at various depths in Australia's Grand Canal (see text on opposite page).



Photographs by Charles Barrett

LIVING CORAL AS IT APPEARS AT LOW TIDE

These patches are a lovely purple; other kinds are golden-brown, emerald-green, and rose-tinted. Among them dart gay little fishes, while gorgeous sea anemones "blossom" from the sand.

THE GREAT BARRIER REEF AND ITS ISLES

The Wonder and Mystery of Australia's World-Famous Geographical Feature

By Charles Barrett

Author of "In Australian Wilds," etc., Editor of "The Victorian Naturalist"

IF THE sea went dry along the east coast of Queensland, a thousand miles of coral "maze" would be revealed. The Great Barrier Reef of Australia must not be imagined as a continuous structure, like the Great Wall of China; it is formed by innumerable reefs, and a map of just one section resembles a complex jig-saw puzzle. Then there are the isles, mountainous and forested, of the inner zone, and the atolls and cays that are true coral islands.

For nearly a century the Great Barrier has intrigued science by the problems that it presents to geologists, physiographers, and naturalists. It has lured such masters of marine zoölogy as Alexander Agassiz and A. G. Mayer from America, and recently a British expedition broke camp after a year on Captain Cook's first coral island.

In all the Seven Seas there is nothing so wonderful as this vast submarine "curtain" of coral, the largest coral reef in the world, whose nature and origin remain half-veiled in mystery.

A GRAND SEA CANAL

Tourists from many lands and thousands of Australians have made the voyage through "Australia's Grand Canal," the area between the mainland, with its purple hills, and the Outer Barrier. A calm and pleasant trip during a portion of the year, it may be perilous in the cyclone season.

Many launches and fishing craft have been wrecked among the coral, or gone down in the heart of a storm within the Barrier. But navigation is no longer the nightmare it was to the early voyagers, before the reef mazes had been mapped and routes safe for even large vessels discovered. Danger exists still, but the old fear has gone—the haunting fear of disaster in the Realm of Coral.

Majestic is the meeting of league-long rollers of the ocean and the Great Barrier. On days when the sunlit water behind the coral bastion is calm enough for a canoe, mountainous waves pound the reefs unceasingly. The surf on the Outer Barrier at high tide, when the broad reefs' crests are hidden, presents an amazing spectacle. A "long line of boiling surf, springing up in mid-ocean without any apparent cause," is the late Charles Hedley's description. That great naturalist, whose knowledge of the Barrier was unrivaled, devoted the last few years of his life to the study of its problems.

NEPTUNE'S TEETH IN ROWS

Swain Reefs, far south, mark the beginning of the Great Barrier Outer System. Farther north, the linear reefs are developed. They are some miles in length and up to half a mile across, with broad separating channels.

A lighthouse on Lady Elliot Islet marks the southern limit of coral-formed land, "a broad platform of solid coral half a mile in circumference." Then comes an archipelago, the Bunker Group, followed by the Capricorn Group, popular resort now of naturalists, and almost a picnic ground for holiday-makers from the mainland.

Within the Tropics, the maze is multiplied. From a hill at Cooktown, you may see, as Captain Cook did in 1770, the shadows of the coral reefs wherever you look out to sea. The navigator who explored 2,000 miles of the east coast of Australia was ignorant of the existence of coral in those waters when his ship struck on Endeavour Reef at night.*

Had the weather been stormy she must have been lost, for coral fangs had pierced her hull. But calm sea enabled the sailors to "patch up" the bark by "fothering," and Cook sailed her to the beach for careening and repairs. Meanwhile, gazing from the hilltop, he discovered the coral.

---

* See, also, "The Columbus of the Pacific," by J. R. Hildebrand, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1927.

Photograph by Charles Barrett

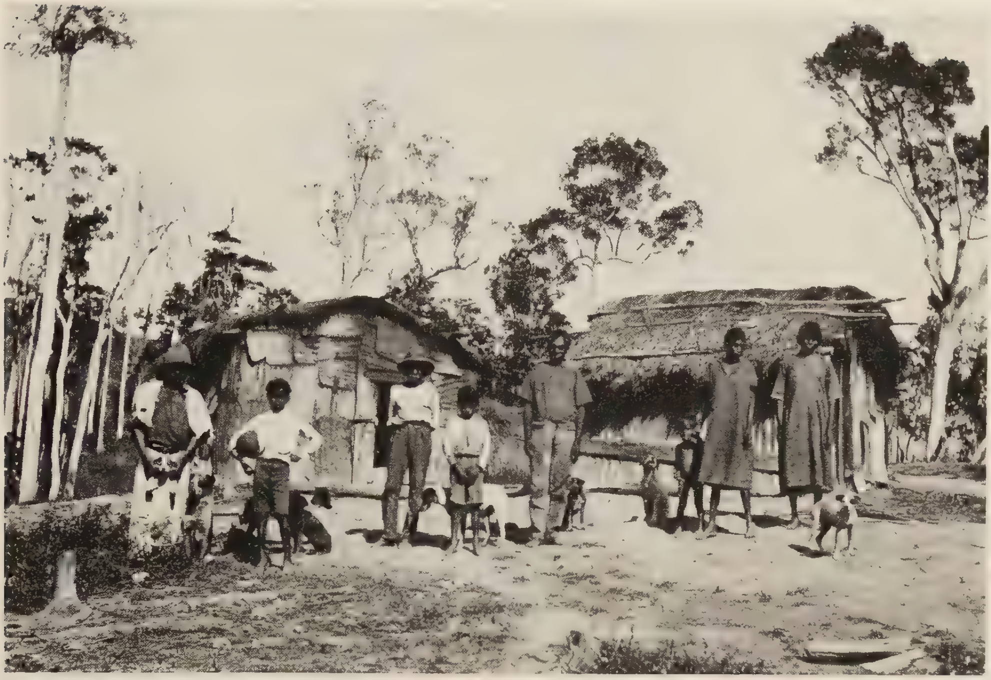
THE BUTTERFLY HUNTER HAS FEW DULL DAYS ON THE BARRIER REEF

Gorgeous butterflies, including "bird-winged" forms, float about tropical island blossoms.

Photograph by Capt. Frank Hurley

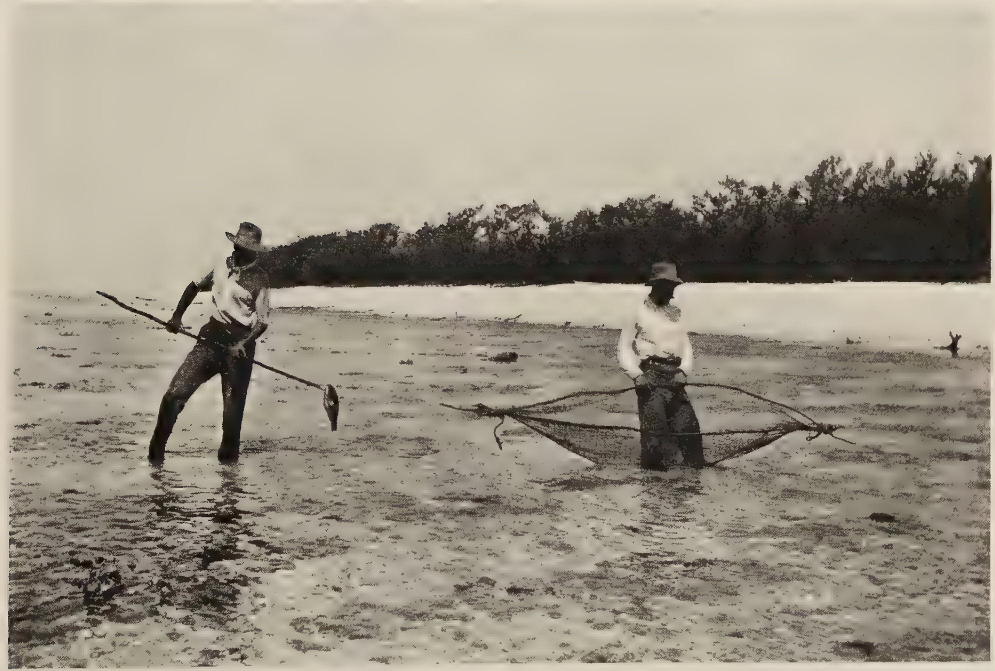
FISHING AMONG THE CORALS

The root of a certain vine, pulped and immersed in the pools, drugs the fish, so that they may readily be caught by hand by this native of the Murray Islands, in Torres Strait.



IN A HILLTOP VILLAGE OF NORTH QUEENSLAND ABORIGINES

Civilization has put clothes on these natives, whose ancestors were cannibals.



Photographs by Charles Barrett

FISHING WITH IMPROVISED "TACKLE" IN AN ISLAND LAGOON

The demands of the cook are often thwarted by the naturalist, who claims for his specimen jars rare fishes that might be good eating.

Photograph by Charles Barrett

REFLECTIONS ON THE REEF

Scientists on Low Island, pegging out "claims." Some areas of the coral were kept fenced in for months, and daily observations on the animal life within were recorded. Thus was the growth of trochus shells studied.

With a seaworthy ship again, he won a way out of the maze, gaining open ocean through one of the great openings in the Barrier. He escaped many dangers only to meet with others a few days later.

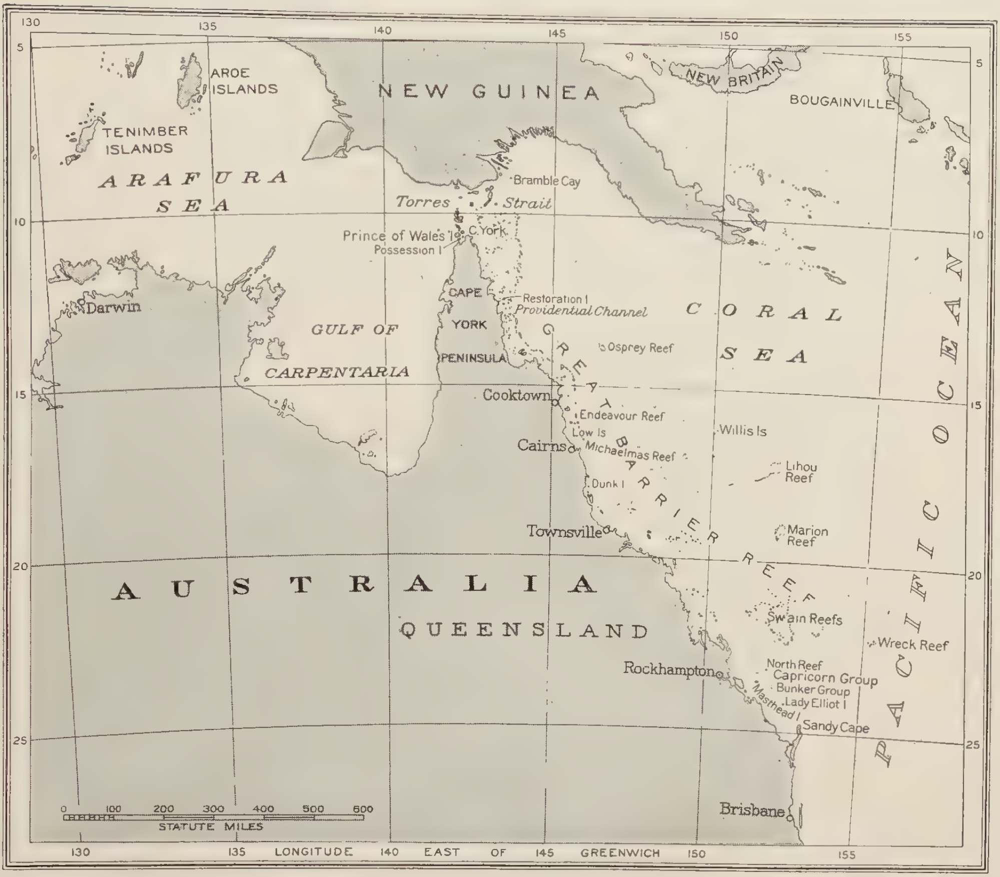
The *Endeavour*, becalmed off the Outer Barrier, was borne toward the reef. She rose at last on a huge wave and seemed doomed to destruction, with only the breadth of a wave between her and the coral. But "a light air of wind sprung up," and the ship was saved.

Captain Cook sought eagerly for an opening, and found his "Providential Channel." He was in our Grand Canal once more, and with infinite care took the bark to Torres Strait. Landing on an island which he named "Possession," he claimed the whole eastern coast of Australia for Britain, in the name of King George III.

A memorial to Captain Cook has been erected on Possession Island by the Federal Government, a simple obelisk bearing a tablet of bronze.

BLIGH OF THE "BOUNTY"

Bligh, commander of the *Bounty,* and his 18 men who were faithful, made that memorable open-boat voyage from Tahitian waters to Restoration Island, within the Great Barrier, in 1789. The muti-


NEW GUINEA
NEW BRITAIN
BOUGAINVILLE
AROE ISLANDS
TENIMBER ISLANDS
ARAFURA SEA
Torres Strait
Bramble Cay
Prince of Wales I
C. York
Possession I
Darwin
GULF OF CARPENTARIA
CAPE YORK PENINSULA
Restoration I
Providential Channel
Osprey Reef
CORAL SEA
Cooktown
Endeavour Reef
Low Is
Cairns
Michaelmas Reef
Willis Is
Lihou Reef
Dunk I
Townsville
Marion Reef
GREAT BARRIER REEF
AUSTRALIA
QUEENSLAND
Swain Reefs
Wreck Reef
Rockhampton
North Reef
Capricorn Group
Bunker Group
Lady Elliot I
Masthead I
Sandy Cape
Brisbane
PACIFIC OCEAN
0 100 200 300 400 500 600
STATUTE MILES
130 135 LONGITUDE 140 EAST OF 145 GREENWICH 150 155
5 10 15 20 25

Drawn by James M. Darley

THE GREAT BARRIER REEF, A SUBMARINE CURTAIN OF CORAL

In all the Seven Seas there is nothing more extraordinary than the vast chain of reefs, atolls, and cays extending off the east coast of Australia—at once a challenge and a lure to men of science.

neers' victims reached the reef at midnight, or rather came within sound of the surf, and two days later found a passage to safety. The boat voyage was continued along the east coast of Queensland and through Torres Strait to Timor.

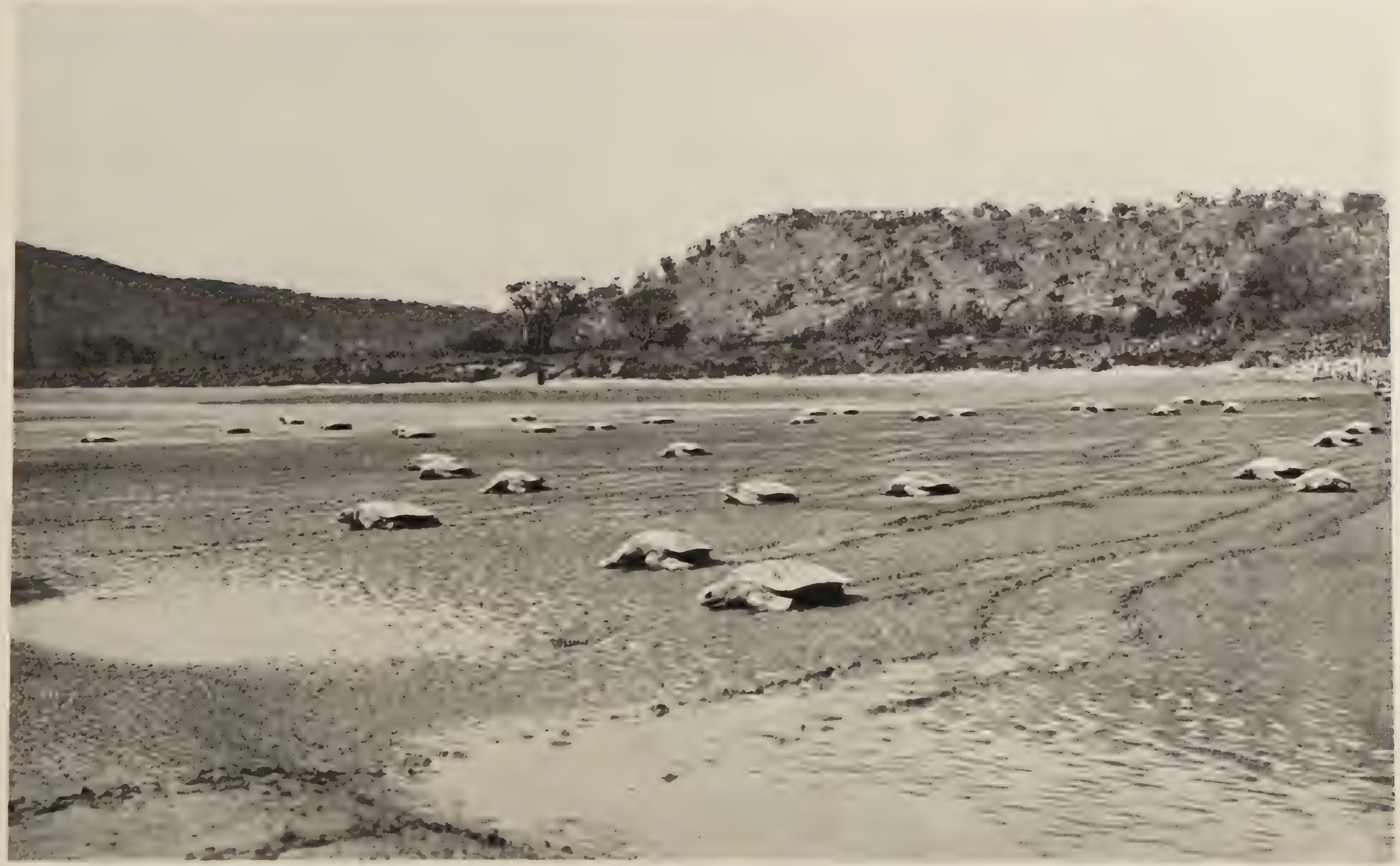
These old-time perilous voyages are discussed still in Australia. And round the campfire on a coral isle the talk may turn from Cook's discoveries and Bligh's amazing boat voyage to the recent loss of a launch, or the fate of a large steamer, sunk in a cyclone within a few miles of the mainland.

The Grand Canal varies in width from 20 to 80 miles. There are two regions, however. The inner one is narrow and fairly free from the perils which make the outer zone impossible for shipping. Only small craft are navigated among the reefs of the outer zone.

Luggers are sailed along the channels, with coral fangs threatening destruction—sailed often where the reefs are uncharted, in the quest for sea slugs and pearl and trochus shell. Japanese own many of these venturesome craft.

The depth of the sea outside the Great Barrier is profound, but in the zone where coastal steamers go safely it varies from about 10 fathoms to 20; the outer zone is much deeper, up to 70 fathoms.

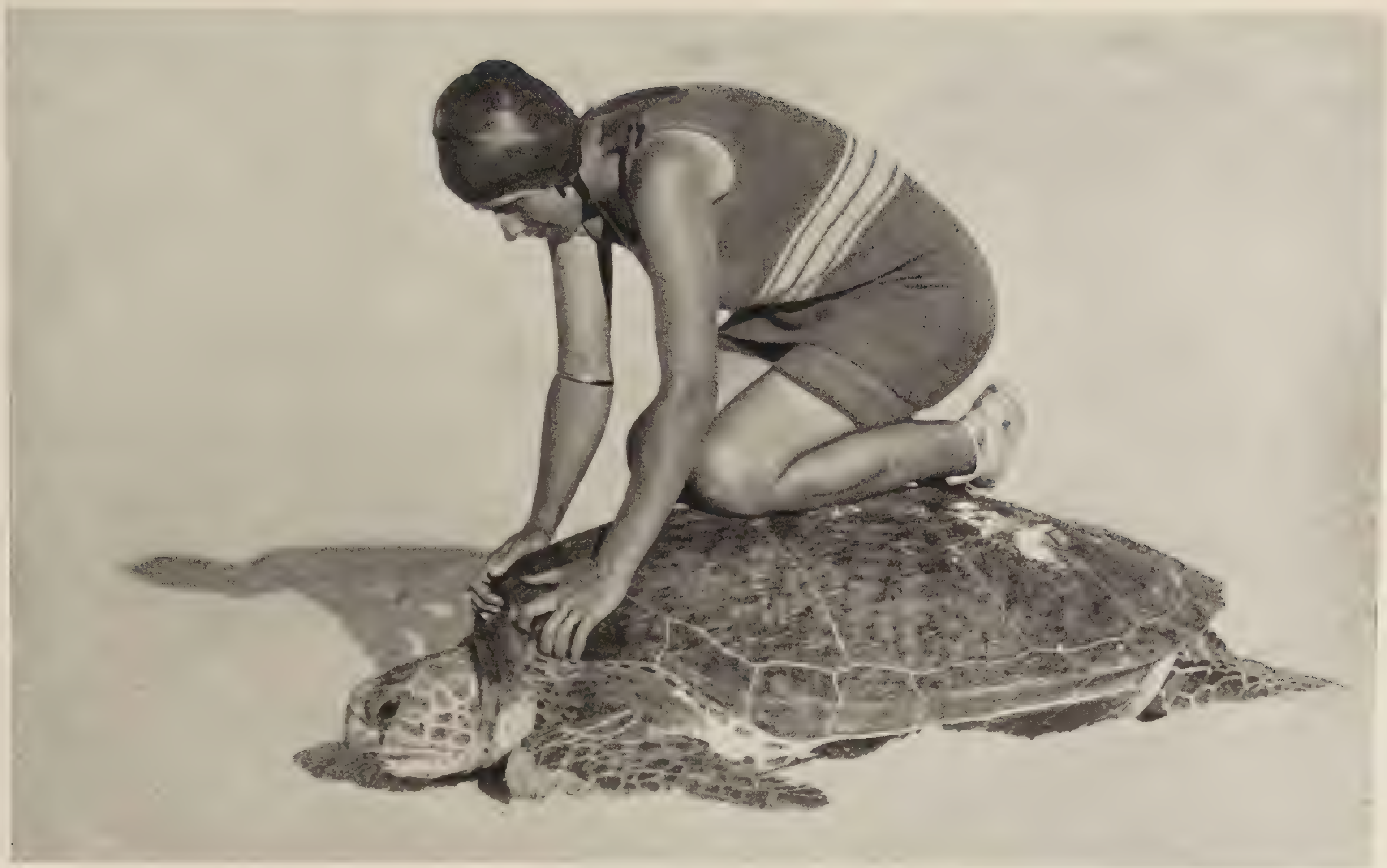
It is between these two zones that the mountainous islands lie, many of them beautiful and some the homes of happy people. Over hundreds of miles of sea they are strung, close together or with long gaps between.



Photograph by William Jackson

RACING TO THE SEA

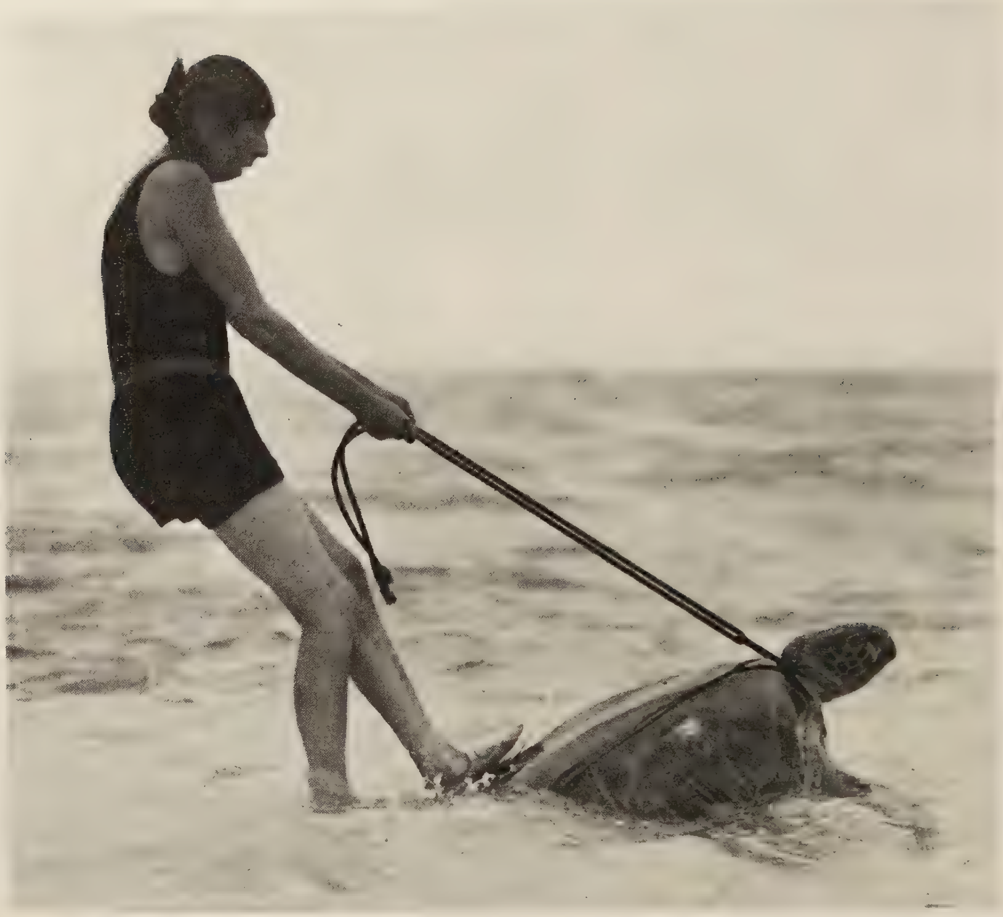
Sea turtles are seldom seen out of the water in the daytime. They steal ashore at night to lay eggs (see page 365). This beach is turtle-strewn because the creatures were captured and rendered helpless by turning them on their backs. In the morning they were released, and, in making for the sea, provided the cameraman with an excellent shot.



Photograph by Otho Webb

THE MERMAID AND HER STEED

On the beach the turtle is clumsy and deliberate, but once in the water it moves fast and promptly rids itself of its rider.



Photograph by Otho Webb

TURTLE-RIDING IN BARRIER REEF WATERS

A game that requires a steady nerve and a bathing costume. Though a turtle can carry a person with ease, it is quite a feat to ride one after it has entered its natural sphere, for it moves swiftly.

Thousands of folk who make the winter tour to Queensland from southern ports say they have been to the Great Barrier Reef, whereas they have merely sailed among the lofty islands, maybe without landing even on an atoll or a cay, the low coral isles beyond the high ones of granite. Only the few who go north venture to seek the actual Barrier, where that long line of thundering surf rises in mid-ocean.

There is charm in the Grand Canal trip, and life is pleasant on the favored islands, where a bungalow may nestle amid tropical fruit trees and palms, with a creek singing near on its little journey to the sea. Men have lived half a lifetime on a Barrier Reef isle without desire to wander. It may be a lotus-eating life, or one of healthy work and play, as you please.

Rich men and poor men are lured to the region. Beach combers are rare now, yet here and there one meets with the cheerful loafer, who takes to a task only at the urge of sheer necessity. They tell stories, up North, of the old colonial days, when the holiday tourist was a novelty and life was rough and ready all through the year, in ports and on the settled islands.

SPANISH TREASURE IN THE SEA

Romance among the reefs there is, and I have seen relics of the old-time voy-

Photograph by Otho Webb

THROUGH CRYSTAL-CLEAR WATER BÊCHES DE MER ARE PHOTOGRAPHED LYING ON THE FLOOR OF A LAGOON

Known also as trepang, sea cucumber, or sea slug, the bêche de mer crawls about on coral reefs. Black boys dive for the edible species at low tide, spear them from punts, or capture them by hand in shallow water. At the curing stations they are boiled for 20 minutes, slit, gutted, sun-dried, and smoked. The industry is an important one for Australia, for the Chinese buy quantities of them as a soup ingredient (see, also, text, page 380).

agers recovered from the sea. But sanguine treasure seekers, imagination fired by stories of lost galleons, were better employed seeking on "pirate islands" than among the coral of the Great Barrier. Coins *have* been found, Spanish ones, too; yet, in these waters, it is far more profitable to go pearl-fishing than diving for "fairy gold."

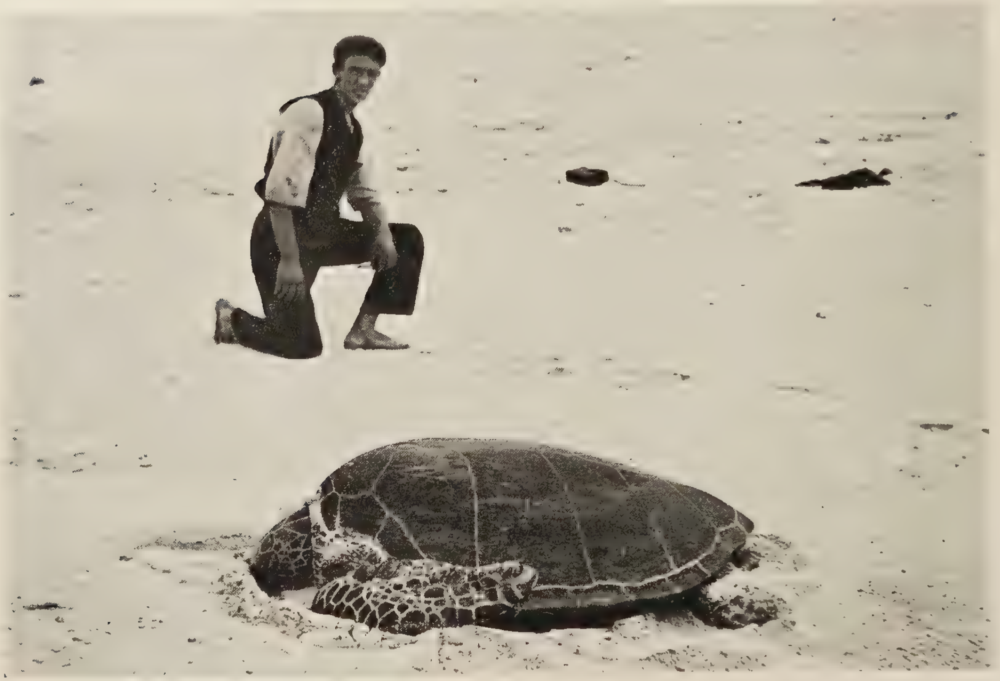
Spain, though, played her part in pioneer navigation of Australasian seas. In 1605 three ships under Admiral de Quiros sailed for the South Pacific from Callao. The captain of one was Luis Váes de Torres, whose name lives forever as that of the strait between Australia and New Guinea. His vessel became separated from the other two, and Torres was probably the first European to sight Cape York Peninsula, the northernmost point of Australia, and Prince of Wales Island.*

NATURALIST JUKES FIRST SCIENTIFIC INVESTIGATOR

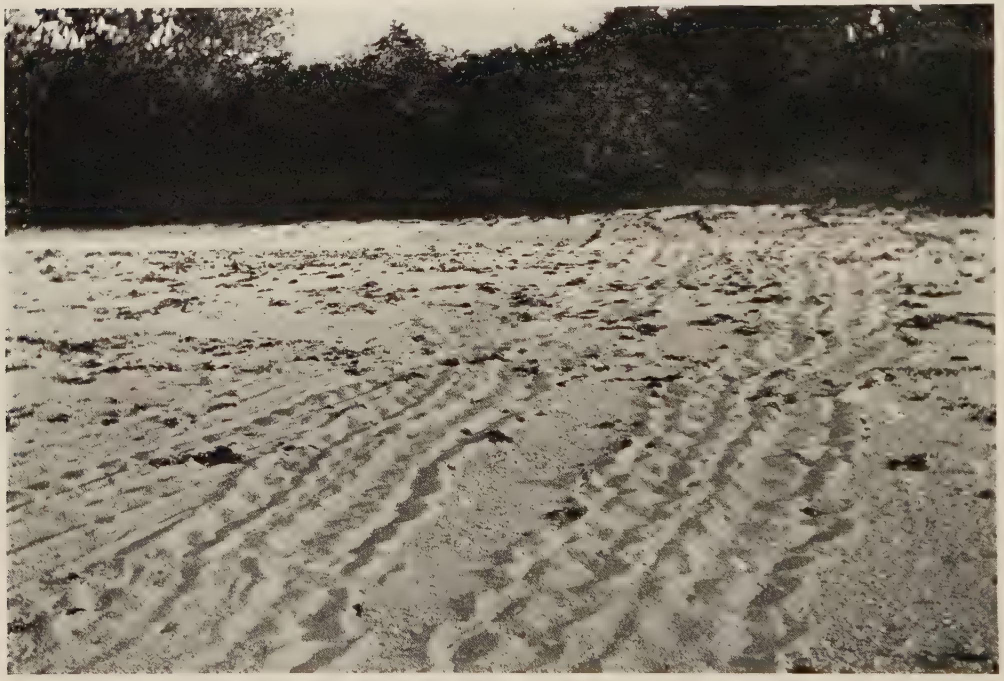
But Torres's discovery was a secret from the world until 1762, when among the archives at Manila the record of his

---

* See, also, "Geography and Some Explorers," by Joseph Conrad, in the NATIONAL GEOGRAPHIC MAGAZINE for March, 1924.



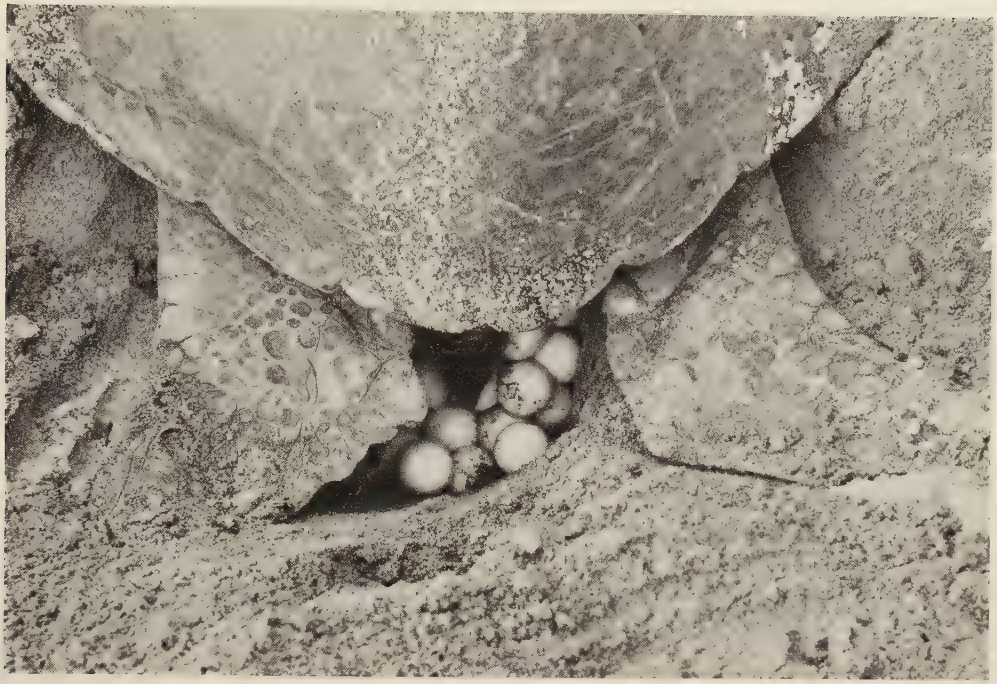
CAUGHT NAPPING ON A CORAL ISLAND BEACH



Photographs by Charles Barrett

TURTLE TRACKS ON A TROPICAL ISLE

Green turtles visiting islands of the Great Barrier region lay their eggs in big holes dug in the sand with their flippers. The heat of the sun hatches the eggs (see page 366). Broad tracks are furrowed from the waterside to the edge of vegetation by the lumbering sea creatures.



Photograph by Otho Webb

THE GREEN TURTLE LAYS FROM 100 TO NEARLY 200 EGGS

The eggs are round, white, soft-shelled, and smaller than billiard balls. Before she lays them, however, the female tries to mislead all enemies as to the location of the nest. She scoops out several pits during a visit to a favorite beach, but postpones laying until next day. Then she digs new pits, fills them partially, leaves others unfilled, and finally excavates still another nest, where the eggs are deposited and the hiding place smoothed over.

great voyage was found by the British. They gave honor where it was due, naming the strait after its discoverer.

Scientific investigation of the Great Barrier Reef began when H. M. S. *Fly* cruised in the Coral Sea and other waters.* Her voyage extended over several years, 1842-1846, and J. Beete Jukes was the naturalist on board her, a geologist whose interests were not confined to rocks. Jukes wrote the first description of the Great Barrier, which remains one of the best general accounts we have of this geographical wonder:

"The Great Barrier Reefs are thus found to form a long submarine buttress, or curtain, along the northeastern coast of Australia, rising in general precipitously from a very great depth, but resting towards the north on the shoaler ground of Torres Strait, and towards the south on the bank stretching off from Sandy Cape.

"If it were to be laid dry, this great Barrier would be found to have a considerable resemblance to a gigantic and irregular fortification, a steep glacis crowned with a broken parapet wall, and carried from one rising ground to another. The towerlike bastions, of projecting and detached reefs, would increase this resemblance."

Captain Cook's description of a coral reef, forgotten by all, perhaps, but readers of the great navigator's "Voyages," is worth quoting:

"A reef such as one speaks of here is Scarcely known in Europe. It is a Wall of Coral Rock rising almost perpendicularly out of the unfathomable Ocean, always overflown at high Water generally 7 or 8 feet, and dry in places at Low Water. The Large waves of the vast Ocean meeting with so sudden a resistance makes a most Terrible Surf breaking Mountains High . . ."

W. Saville-Kent, whose monograph on the Great Barrier Reef is notable for splendid illustrations, was Commissioner

---

* See, also, "Into Primeval Papua by Seaplane," by E. W. Brandes, in the NATIONAL GEOGRAPHIC MAGAZINE for September, 1929.

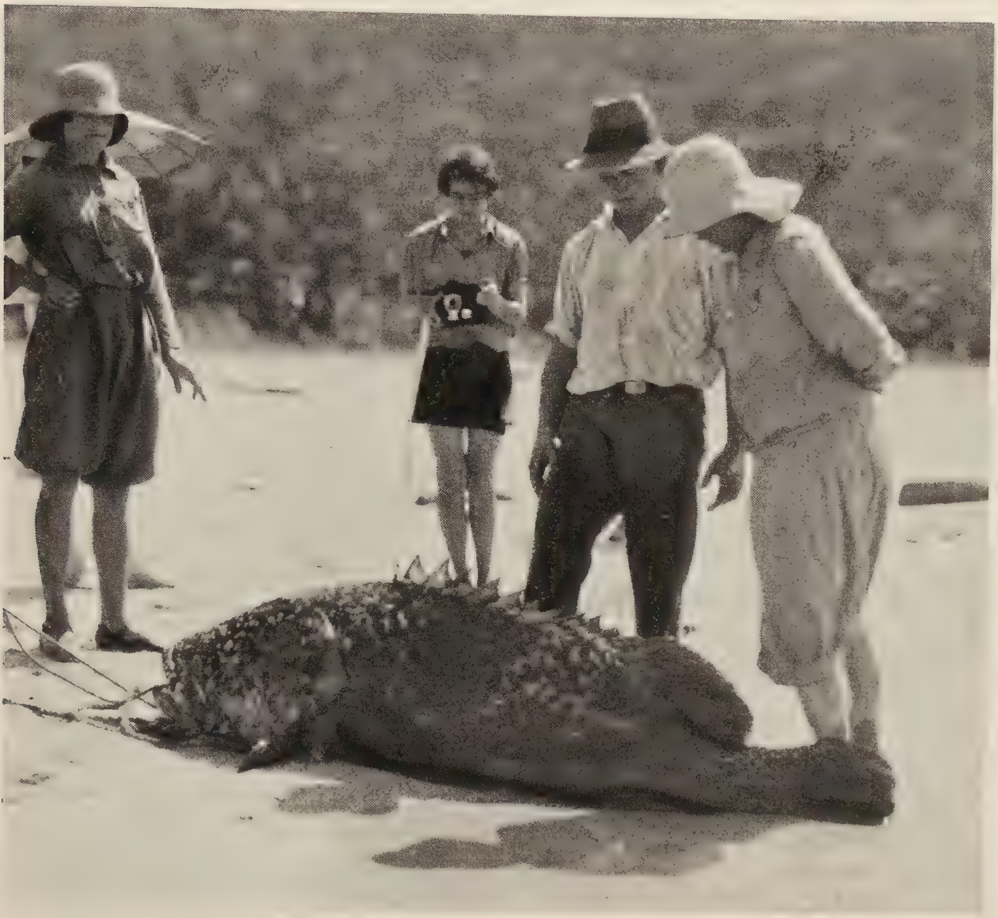
GREEN TURTLE YOUNG THREE DAYS OLD

When hatched, they dig themselves out of the sand and start for the water.

Photographs by Otho Webb

HUGE CLAMS PROVE DANGEROUS TO THE UNWARY

Many species of marine animals are found along the Barrier Reef, some whose shells are large enough to form a pair of child's bathtubs. Two sea slugs may also be seen—one in the foreground, the other behind the shell.



Photograph by Otho Webb

A 260-POUND ROCK COD CAUGHT ON A HAND LINE

The pearl divers of the north are said to dread these giant fish far more than they do the sharks, which they consider cowardly and more easily frightened off. When he attacks, the cod is dogged and determined in his methods. He lies in wait among rocks and reefs, from which he rushes forth to seize his victim. "Rock cod" is the vernacular name for several fishes that have little relationship to the true cod.

of Fisheries for Queensland. He made an intensive study of fishes and other marine products, and has never been excelled as a photographer of corals *in situ.*

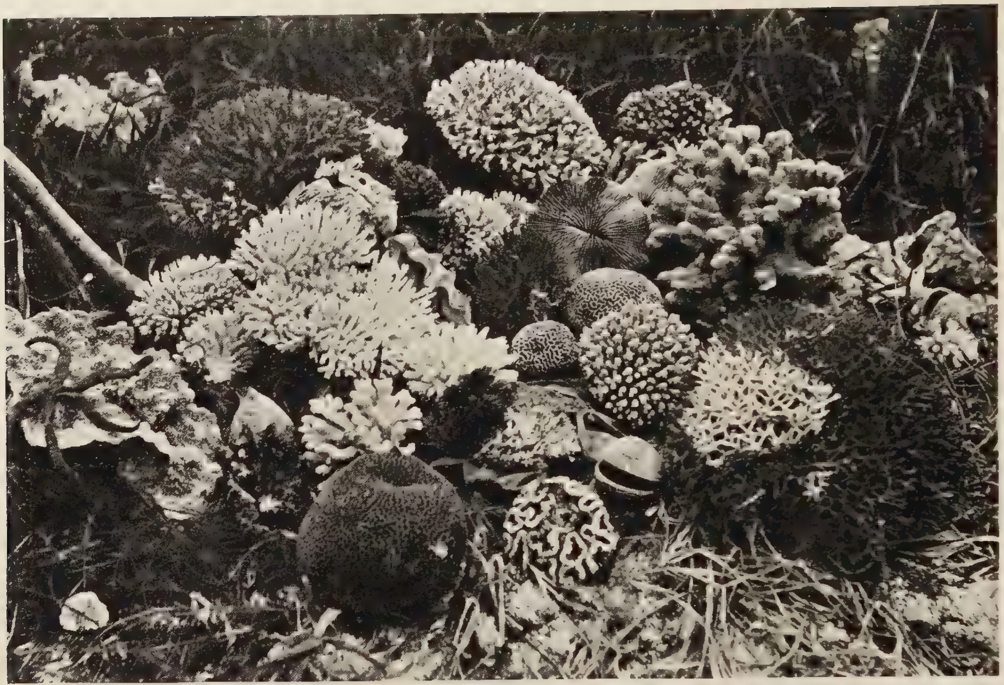
Alexander Agassiz visited the Great Barrier Reef in 1896, in the course of his survey of coral reefs generally. Other scientists followed. The latest and most extended expedition ended in July, 1929, when British scientists under the leadership of Dr. C. M. Yonge quitted Low Islets, their headquarters for a year.

MERMAIDS OF THE ISLE

These scientists, some from famous universities—Oxford and Cambridge and Edinburgh—were all young, keen, and capable. They landed on the tiny isle, enthusiastic and cheery as a band of holiday makers, and settled down to work immediately. Their enthusiasm never flagged, though often they were weary.

There were women among them. The leader and his first lieutenant, and the doctor who specialized in starfishes and their kin, were accompanied by their wives, and a girl from Scotland was the phytoplankton expert.

These young British ladies didn't come to Western Low Island, as one of them said crisply to a visitor, to "look pretty," but to share whatever was going, manual



Photograph by Charles Barrett

CORALS AND SHELLS THAT REWARDED AN HOUR'S RAMBLE ON MASTHEAD ISLET REEF

work as well as study. They helped carry heavy luggage from the launches to the huts; used saw, and chisel, and hammer; insisted on joining the water-fatigue; washed socks and shorts, and were "on duty" in the laboratory every working day.

The huts on Low Island were stoutly built of native timbers, from mainland forest originally. They were large enough and comfortable. Elaborate apparatus was brought to the coral island. The chemist's corner was a picture, with its array of bottles and tubes and balances. In a wooden hut on the isle that Captain Cook was the first white man to see, 20th-century science was at home, as in a museum laboratory (see page 372).

The lighthouse on Low Island, the western isle or islet of the "twins," whose beam has been for years a guide to mariners, had keepers who were ever willing helpers. They welcomed the invasion of their lonely flake of coral rock and sand, with its coconut trees and a few other trees and bushes—an isle around which one could ramble in less than half an hour and cross in two or three minutes.

"Andy," a Queensland aboriginal, was handy man; he did the chores for the busy naturalists. His wife was cook, his little daughter waited at table.

While the "home" reef was the hub of things, trips were made to other islands, far and near, and to the Outer Barrier. The expedition had launches in commission through the year, and for plankton collecting and sea-water sampling they were used freely.

A PERILOUS BOAT TRIP IN A DECEPTIVE SEA

"Summer isles of Eden" like gems on tranquil seas; the beauty of blue lagoons and graceful coco palms is not imaginary. But the smile of the sea may be deceptive, luring you, in a small craft, from shelter toward the outer reef, and changing to menace swiftly.

One boat trip I made with other naturalists in quest of a reef of the outer zone was perilous. We had less than ten miles of open water to cross from our snug little coral island, and we started serenely. Soon the launch was in heavy seas. And the reef we sought was elusive. Far to windward, finally, a line of breakers was seen; nearer, the light-green of shoal water.

Photograph by Charles Barrett

A MARINE ZOÖLOGIST SORTS HIS HARVEST FROM THE CORAL REEF

In the lee of the reef, white with raging surf, we lay to, waiting on the tide which should be ebbing. Homeward bound, hazy as to bearings, we sailed into a maze of coral. The helmsman needed all his wits, and the warnings of a man at the masthead and another at the prow. Perilous navigation it was, in shallow water thickly sown with hazard. We won through, dodging hidden dangers and following tortuous channels through the maze. Then out into the open, to meet the swinging seas again.

RIVAL THEORIES REVIEWED

Rival theories regarding the formation of coral reefs and islands have been warring against one another since Darwin's day. Subsidence, the simple and beautiful theory evolved by the author of "The Origin of Species," after years of eclipse is shining forth again.

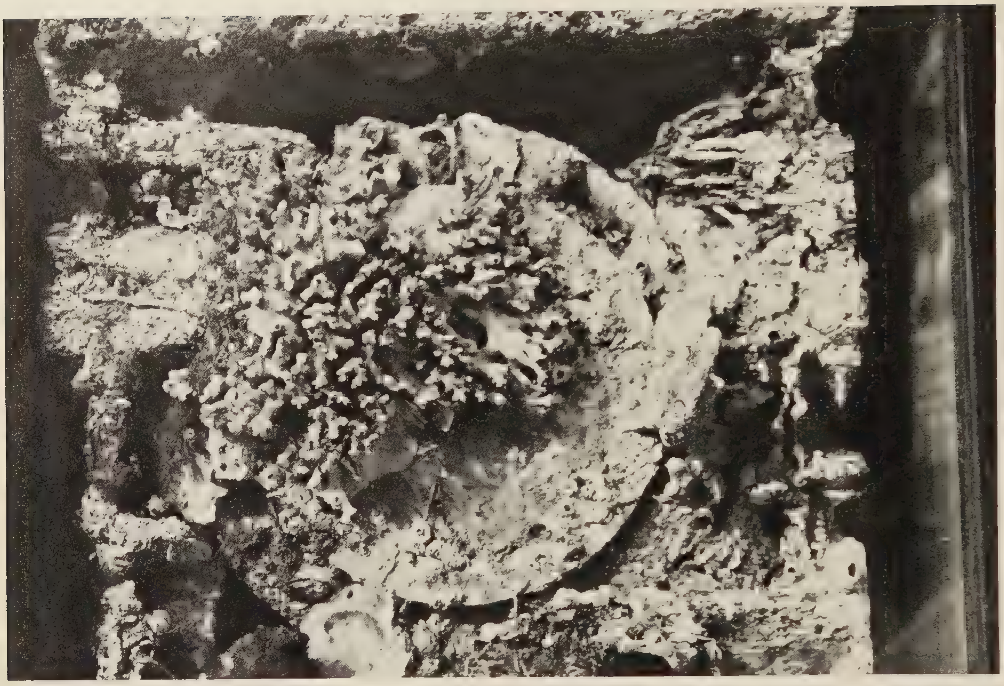
Subsidence, the "drowning" of land masses, as granite islands, and the upgrowth of coral from the slopes to the surface, offers a reasonable explanation for the existence of the Great Barrier. The weight of evidence seems at present in its favor. Notable among the other theories is that of submarine platforms on which Nature has reared the mighty structures known as coral reefs.

Apparently, reef-building corals are unable to flourish at a greater depth than about 40 fathoms. Many scientists have estimated the age and the thickness of the Great Barrier. Agassiz, among others, favored a thin veneer, but Jukes believed the reef to be of great thickness, and he accepted Darwin's as the true theory of coral reefs.

More than one authority has ascribed a Mesozoic age to the Great Barrier; others date its origin from the Tertiary; and Agassiz, from Cretaceous times. Then there is the glacial-control theory, which gives the Barrier a thickness of between 200 feet and 300 feet, and dates it from the Pleistocene. That atolls had their beginning as solid blocks, the interiors of which were dissolved by the "chemistry of the sea," is still another theory that has its champions.

BORING THROUGH THE BARRIER

Long ago a party of scientists spent three months on a coral island, Funafuti, a "dot" of the Ellice Group, about 70



Photograph by Capt. Frank Hurley

CORAL GROWTH ENCRUSTS A PORTHOLE

Six and three-quarter inches of coral have grown on this relic blasted from the British steamer *Quetta*, which struck Quetta Rock, southeast of Cape York, and foundered in 1890. The photograph is of special interest because it indicates the rapidity of growth of coral formations.

miles north of the Fiji Islands and some eight degrees south of the Equator. The object of the expedition was to test the correctness of Darwin's coral-atoll theory by putting down a diamond-drill bore 500 feet or more into an atoll to obtain a core of rock.

At a depth of 698 feet boring was ended on account of a serious breakdown of the machinery. Subsequent boring exceeded 1,100 feet. Valuable material was gained for study, but the origin of atolls was not disclosed beyond doubt. We have still to weigh conflicting evidence, and vote for Darwin or for one of the rival theorists.

Another boring venture was undertaken, this time by the Great Barrier Reef Committee, which selected for operations a coral sand cay on Michaelmas Reef, within easy distance of Cairns, the popular holiday resort on the north coast of Queensland. My friend, Charles Hedley, Scientific Director for the Committee, had charge of the boring operations, carried out under many difficulties.

The object of the bore was "to obtain quantitative information as to the thickness and nature of the coralline deposit, and, further, to determine the character of the foundation on which the coralline mass was built."

The depth reached was 600 feet. Beginning with coral dune sand of the beach, passing through solid coral (porites) from 12 feet to 19 feet, and various other "formations," the bore ended in gray-green calcareous glauconite ooze. Coralline material, except for a few feet of solid coral, was loosely coherent and extended to a depth of nearly 430 feet. Beneath this, the report records (apart from a little coral sand), to the depth of 600 feet, there were only rounded quartz sand with abundant foraminifera and shell fragments, and much of the glauconite material.

AMONG THE CAPRICORNS

The evidence from the boring indicates that the coral mass is youthful, and that subsidence in the area has been consider-

Photograph by Charles Barrett

SHEARWATERS NEST IN MILLIONS IN AUSTRALIA

There are "mutton-bird islands" to the south of the continent as well as in the Great Barrier region

able. Other bores, as funds become available, are likely to be put down, perhaps on one of the Capricorn Islands.

I camped with other naturalists on Masthead Islet, of the Capricorn Group, one summer for a while. We visited the other islands, all uninhabited and lacking fresh water, apart from rainwater stored in tanks on one frequented by turtle hunters. We studied sea-bird life and the turtles, went reef-combing and gathered a rich harvest for science.

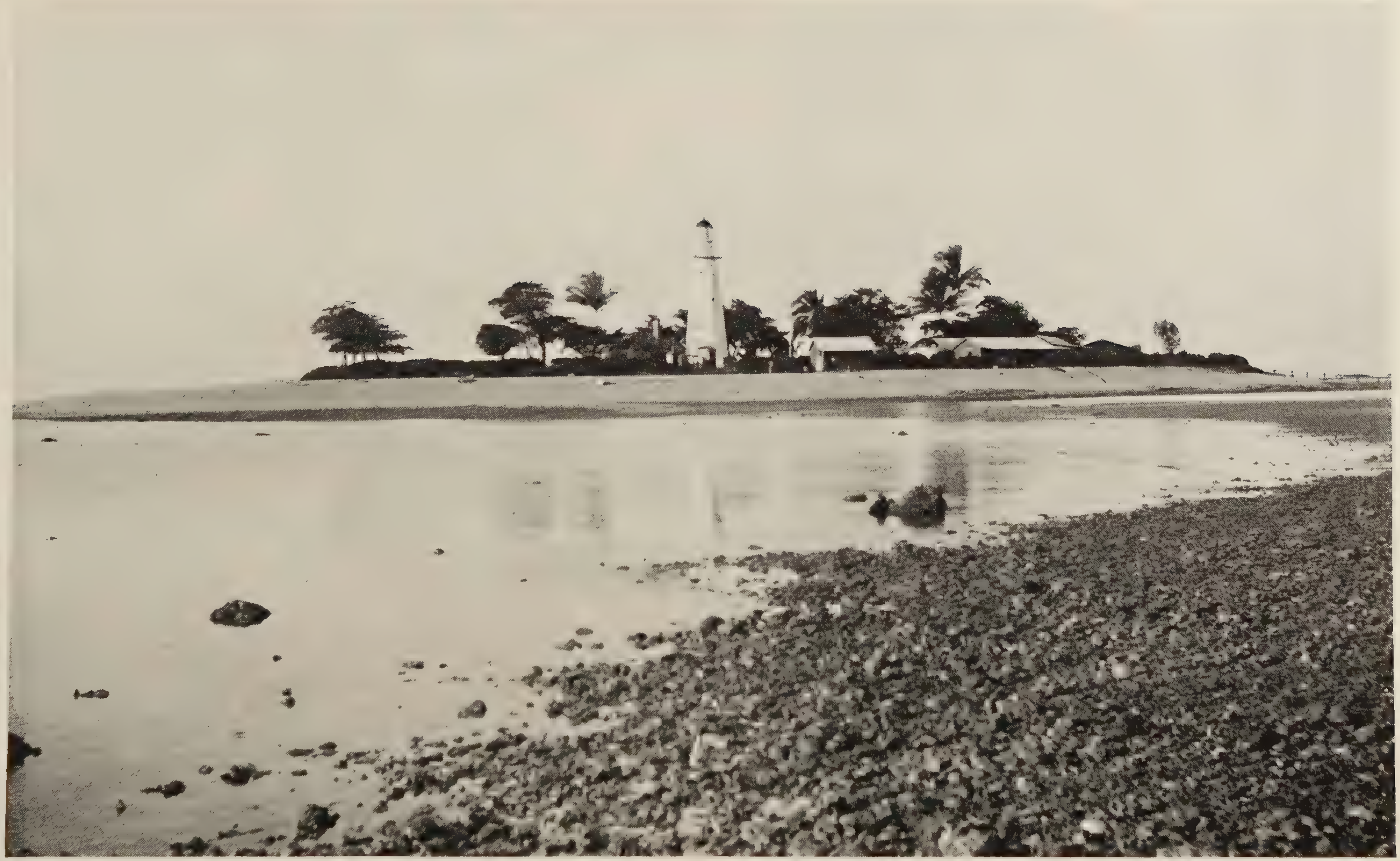
Lying at the southern extremity of the Great Barrier Reef, from which they are separated by a channel, the Capricorn Group consists of pseudo-atolls. Large vessels cannot safely approach the fringing reef, and we had a long row in the boat over the coral at flood tide from our ship to the shore.

A tropical rainstorm burst before our tents were up and the stores under cover. Nature gave us a drenching, but failed to dampen our spirits. We were as happy as holiday-makers on this coral island, which, as we neared it in our craft, had seemed nothing but a long gray shadow on the sea.

Masthead is the westernmost of a chain of reefs, extending for 54 miles, and all of the Capricorns are grouped about the Tropic which gives them their name. At low tide, we could ramble from camp over causeways of coral, an oblong reef about four miles from east to west and a mile and a half across, its crest perhaps a dozen feet above sea level. At high water Masthead shrunk to a sand bank about 100 acres in extent, placed near the western end of the reef and densely vegetated. It lacks a lagoonlet and is raised only a few feet above the sea.

The reef crest is "one long, unbroken sepulchre of actinozoan life" (Hedley). But what living wonders we found among the coral, in the shallow lagoon, and the causeway channels—wherever we looked, indeed!

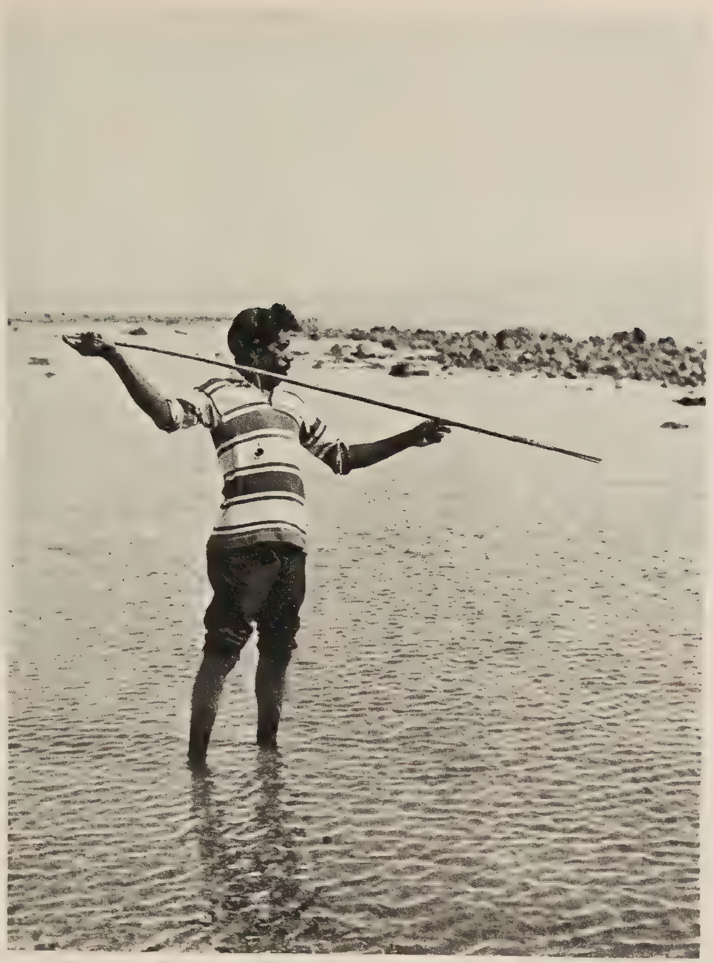
Now, Masthead is subject to the action of racing tides, with a range of 15 feet. At a speed of two knots the sea moves over the reef, and tides are "the chief

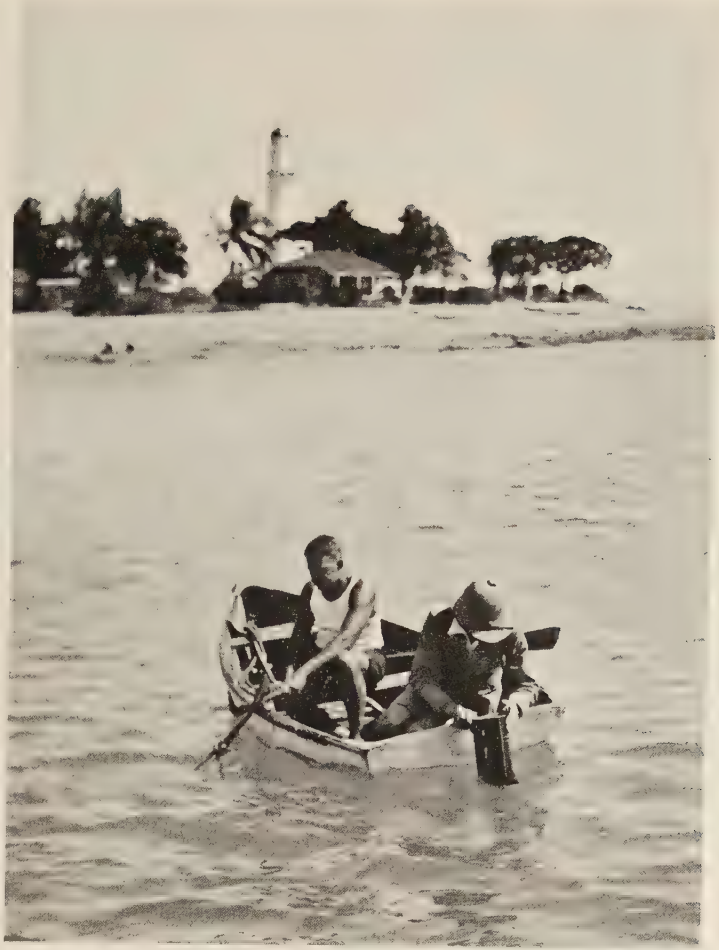


Photograph by Charles Barrett

CAPTAIN COOK'S FIRST CORAL ISLAND

Western Low Island (or islet), on which the British Great Barrier Reef Expedition had its headquarters for a year of intensive study. The expedition's huts are to the right of the lighthouse (see, also, text, pages 367-8).





Photographs by Charles Barrett

THE ABORIGINAL OF TO-DAY FISHES WITH A THREE-PRONGED SPEAR, AS DID HIS FOREFATHERS

THE WATER TELESCOPE REVEALS BEAUTIES OF SUBMARINE GARDENS FAR BELOW

Photograph by Charles Barrett

THE REEF HERON'S BABY MAKES NO CLAIM TO BEAUTY

His nest is found on coral islands whose reefs provide feeding grounds for the parent birds at low tide.

The tide was rushing over the reef, and sometimes swept the waders off their feet. Large sharks swam near, and great turtles passed by at top speed. It was jolly to be on the beach at last, to bask in tropical sunlight and drink deeply of "billy" tea.

TRACKING THE TURTLES

"Turtle Island" is a nickname for Masthead, and surely is well deserved, for green turtles swarmed in the surrounding sea. They attain a length of five feet or more, and are famous as the "raw material" of turtle soup, while their flesh also is eaten in the form of steaks or in stews.

The green turtle is not confined to Australia, but is distributed over the tropical and subtropical seas generally, being ever-present in the Gulf Stream areas about Florida and Cuba especially. It visits the northwestern and northeastern coasts of Australia in the breeding season, depositing its eggs at night in deep holes in the sand on certain islands.

Masthead is a favorite resort of these huge chelonians. We counted nearly 300 one morning along the western beach, and many nests were found on the edge of the scrub.

In the moonlight, peering from cover, we saw the nursery-making. With their powerful hind flippers, the turtles excavated briskly. The eggs, in surprising numbers, were laid quickly; then sand was shoveled over them and smoothed down. Her task accomplished, back went the old lady to the sea.

agents of island building" in this group beyond the hurricane zone.

Far out on the reef, sometimes we forgot to watch for the turn of the tide. And racing the ebb over coral is apt to be painful! Delay means danger. Yet the spell of beauty—coral "flowers" and creatures of the pools—made us loath to hurry beachward when the flood was making.

A landing party for a sister isle of Masthead left the ship at half-flood and the boat struck coral nearly a mile from shore. The passengers, including three ladies, had to wade up to their armpits through swirling water to the island beach.

In nesting time the hunters take toll of green turtles, which usually are captured when retreating from island beaches to the ocean. The luckless creatures are turned over on their backs and thus rendered helpless.

De Rougemont's exploits were remembered, and we tried turtle rides, with less success, but more fun perhaps, than Louis enjoyed, according to his famous story. Our rides were brief and exciting. We crept upon sleeping turtles and made seats of their carapaces. Thus surprised, they scrambled over the sand, plowing quaint furrows with their flippers, and gained the lagoon. Once in fairly deep water, the turtle won the game. A dive unseated the rider, who splashed ashore for another little joyride to the sea.

The united strength of three men was needed often to overturn a turtle caught napping on the sand. Grasping flippers and tail and the edge of the shield, we gave a sharp heave, and our friend was lying helpless on its back. The Turtle Derby of Masthead Islet was a memorable event! The jockeys wore bathing suits, and the "winning post" was just the sunlit sea (see pages 361-2).

A turtle-soup factory, established on one of the coral isles many years ago, still carries on business. During a recent season 36,000 tins of soup, representing about 1,000 turtles, were manufactured in this lonely place. How many of those who enjoyed the soup at banquets or private dinner-tables thought of atoll and lagoon, white beaches, and the hunters of chelonians?

Photograph by Charles Barrett

READY FOR THE CABINET

Bleached by the sun, corals of all kinds form desirable souvenirs of days on a tropical island.

Giant fishes inhabit these waters where the sea flows through deep channels. Groupers and snappers, and other big game fishes provide sport that already is luring Australian anglers and their brothers from other countries as well.

THE SEA BIRDS' REALM

Sea birds of the Great Barrier Reef include shearwaters, gannets (three species), the lesser frigate bird, the red-tailed tropic bird, and several kinds of terns. They congregate on islands of the outer zone and the coral sand banks in nesting time, and form great colonies.

Bird islands of Peru are not more wonderful than certain coral isles and cays of

Photograph by Charles Barrett

ON ISLANDS AND CORAL CAYS TERNS NEST IN LARGE COLONIES

the Great Barrier region. Vast numbers of eggs are collected by aboriginal islanders from the far north, by Japanese trepang and pearl-shell fishers, and other raiders of the rookeries. The Japanese, especially, harvest eggs as "free" food for their aboriginal crews.

Terns' eggs have been taken in boatloads from Bramble Cay and other noted haunts of these birds.

Among the Capricorns, white-capped noddies nest in thousands every year. On Masthead we estimated the bird population at nearly 100,000. The noddies, perhaps 20,000 pairs, were nesting in the pisonia trees; primitive platform-nests, made chiefly of dead leaves, each containing one egg only, and no two eggs of the hundreds examined were exactly alike in their markings. Of shearwaters, or mutton birds, there were some 30,000, nesting in burrows among the pisonias, and filling the night with weird sounds.

As a community, the noddies had regular times of sea and land faring, though hundreds at any hour could be seen on the wing. At dawn a host of graceful birds flew out to sea; about sundown the winged fishers returned. We watched them, never tiring of their beauty, as they flew over land or sea like a legion of big butterflies. At noon, in thousands, they were clustered on pisonia boughs, like tropic fruits strangely formed.

So tame were the noddies that often an egg could be examined only by pushing aside the owner; and the tern, or sea swallow, would peck boldly with her long, delicate bill at an intruding hand.

Shearwaters every night groaned and grumbled in their burrow, but it was little that we saw of the birds. Our cook, however, made a capture. He yelled at midnight, "I've got one!" Only, the bird, blundering into the tent, first had "got" *him.* Cook learned that mutton birds, as short-tailed shearwaters are known, can bite!

EACH ISLAND RULED BY A PAIR OF EAGLES

Sea eagles are familiar birds of the Great Barrier region. Each island of the Capricorn Group I visited was the territory of a pair of eagles; on each was an eyrie—one only, built high in a pisonia, or on a large bush with thick and woody stems. These nurseries were huge piles of sticks and boughs, with an unsavory "apartment" at the top for the young.

Photograph by Charles Barrett

A BABY CROCODILE

© F. Birtles

CROCODILUS JOHNSTONI GROWS TO SEVEN OR EIGHT FEET IN LENGTH

There are two species of crocodiles in northern Queensland: the huge seagoing variety, which has taken toll of human life, and this smaller species that frequents only inland waters.

Photograph by Charles Barrett

FRIENDLY ISLANDERS

These kingfishers on an isle of the Capricorn group were "camp followers" of a party of naturalists. They nested close to the cook's quarters.

Sea snakes are plentiful in these waters, and the eagles prey upon them. Beneath the nests reptile remains are strewn, mingled with those of sea swallows and fishes from the blue lagoon.

Reef herons abound among the Capricorns, nesting in bushes, or choosing for home sites the stilt roots of pandanus, a species of screw palm that grows along the beaches above highwater mark. There are two color varieties of this heron, one slaty blue, the other white, like an egret. They are not distinct forms, because in the same nest one finds, not rarely, one white and two blue chicks, or two blues and a white one—three being the usual number in a brood.

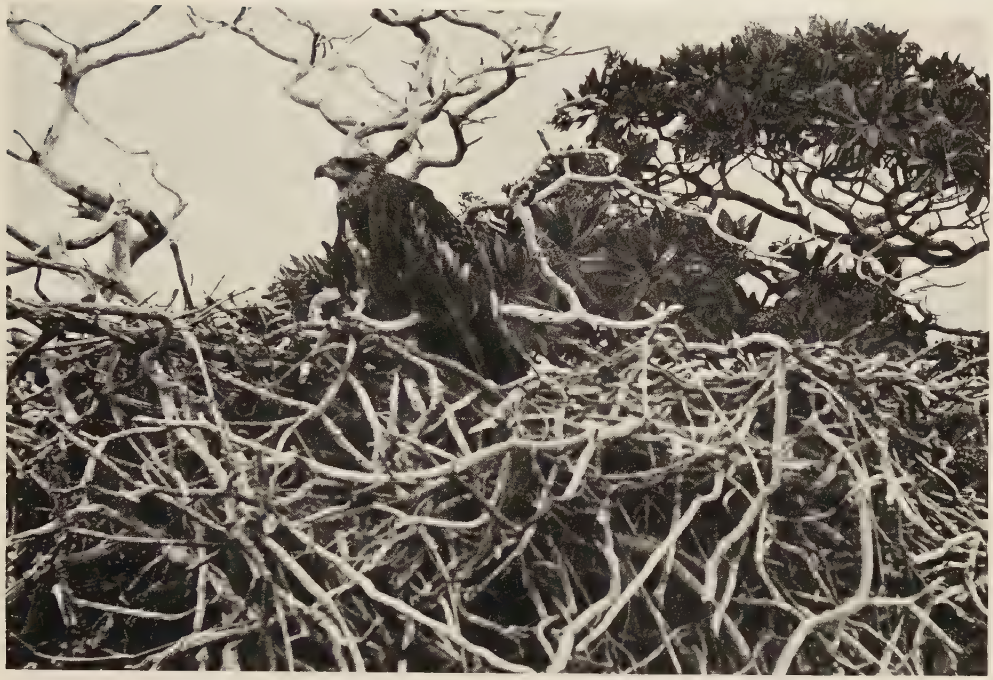
Some light-keepers are bird lovers, and at North Reef I found the herons so confiding that close-up photographs were possible. But the gulls, the dainty silver gulls which nested on the fringe of vegetation, were suspicious.

Oyster catchers ran about the coral strand, and nimble-footed dotterels twinkled to and from the shallows and hightide zone. Where the sand-binding ram-grass grew we located nests of both oyster catcher and dotterel. Kingfishers were visitors from the mainland. One pair came about our camp on Masthead Islet, perching together every morning on a pisonia bough. They were friendly birds, and reared a brood within sight of the cook's headquarters!

CORALS AND SHELLS

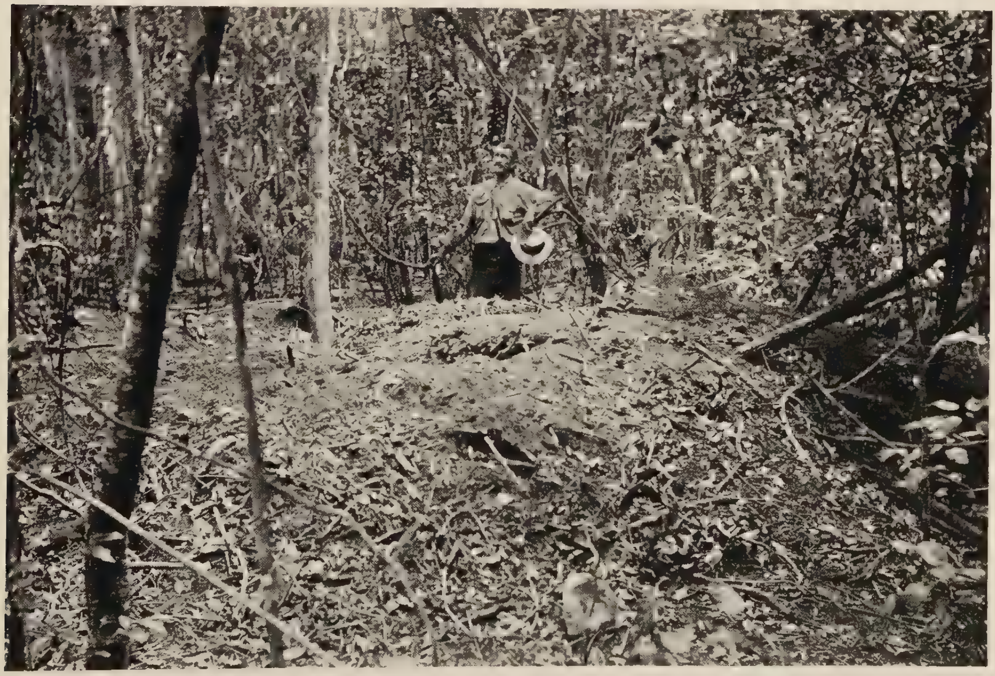
Combing the reef for shells is a delightful recreation. A conchologist might be content to spend a lifetime collecting and studying the mollusca of the Great Barrier Reef. It is rich in lovely species, and quaint ones. Money cowries are to be gathered by the pailful. Tiger, brown-shelled, egg, and others of the cowrie family occur among the coral.

Half submerged in sand in the lagoon are melon, or bailer, shells, the first name suggested by the shape and the color of the shell which, empty, serves well enough for bailing out a dinghy. Soup is made from the flesh of the melo animal, and is said to be savory. Melo is a remarkable mollusk, and its chambered egg capsule is



SEA EAGLES NEST ON ISLES OF THE GREAT BARRIER REEF

The eyries are huge structures of sticks. Deadly sea snakes form a portion of the food upon which the eaglets are reared.



Photographs by Charles Barrett

THE WORK OF MOUND-BUILDING BIRDS OF AUSTRALIA

Huge piles of leaf mold and sand are heaped up with a hotbed of decaying vegetation in the center. The large eggs are deposited in the "incubator," and, when hatched, the chicks work their way to the surface.

Photograph by Charles Barrett

THE NURSERY OF THE NODDY

Among the isles of the Capricorn Group, white-capped noddies nest in thousands. The nests are formed of dead pisonia leaves, mingled with seaweed in some cases. An egg to a nest is the rule, and no two eggs in a colony are identical in their markings.

among the marvels of the coral realm. Each infant melo has a chamber to itself in the "nursery."

Spider shells, with spines that resemble crooked fingers, abound in shallow water. They are whelks that do not "walk," or crawl, but leap along the bottom. The animal is curious in appearance as well as in its habits. The operculum, highly modified, is used as a stabbing weapon.

THE WORLD'S BIGGEST CLAMS

Giant clams (*Tridacna gigas*), whose valves are in demand for use as garden ornaments and even home aquaria, rare or lacking on some of the island reefs, are common on many parts of the Outer Barrier. Their size is astonishing, and pearl divers are said to fear them. Tales of tragedy, of divers trapped by Tridacnas, are not baseless. The great valves, agape, may close like a vise on a man's leg or his arm, in deep water. Tridacna possesses immense muscular power, and, once gripped by its valves, a limb can hardly be released: the victim thus held drowns!

In the British Museum are two giant-clam-shell valves, one weighing 154 pounds, the other 156. But I have seen even larger specimens in Australia. Many of the huge mollusks, alive among the coral, with valves agape, reveal their gay colors and the lovely mantles with the "jewels" along their edges.

Sea slugs, the bêche de mer of commerce, are gathered from the reefs in vast numbers by Japanese and aboriginal "fishers" chiefly. The toll has been too heavy at some of the isles, where now commercial "slugs" are scarce. But the species that make no appeal to the Chinese epicure continue to flourish. At Low Islets, for instance, we saw the nonedibles in thousands, crawling in the shallow-water pools and channels at low tide, often camouflaged in sand: "sand sausages" they have been termed, and they look it! (P. 363.)

The "prickly fish" is of blackish-green color and has a plastic body. Another species, about 3 feet in length, is black and dwells among dead coral. Most intriguing of all the sea slugs, though, is

SEEKING A KEY TO THE MYSTERY OF THE SEA

For chemical analyses and study, samples of sea water were taken at various depths.

Photographs by Charles Barrett

AN ISLAND LABORATORY

The chemist of the Great Barrier Reef Expedition pursues his analysis of sea water.

Photograph by William Jackson

TURTLE NESTS ARE LOCATED BY PROBING THE SAND

Though the artful green turtle tries to conceal her nest, the tracks she makes to it and to the counterfeit ones over the sand are unmistakable, unless the wind has obliterated them. The blacks probe all likely spots with their sticks or spears, and soon locate the right pit (see, also, text, page 374).

Synapta, which grows to two yards in length, and by the novice is mistaken for a serpent. Its body *is* snakelike, and, crawling over the weedy flats, it looks reptilian with its variegated colors, yellows and browns and dull-green.

SEA FLOWERS FLOURISH ON THE BARRIER

Sea urchins, with long, needle-pointed spines that are poisonous, are a menace to the eager naturalist. The points are brittle and break at a touch, causing festering sores in careless fingers. The needle-spined sea urchin bears spines a foot in length.

Sea anemones, no less than living corals, are "flowers" of reef and lagoon. And the Great Barrier is rich in large and lovely species. Emerald-green, scarlet, golden-brown, and electric-blue are among anemone colors. On Low Island I saw the giant *Stoichactis,* specimens measuring more than a foot in diameter and of a brilliant green hue. Prawns and little fishes, exquisitely painted, were messmates of the great anemone. The midgets swam safely amidst tentacles that are charged with stinging proclivities.

The corals' living beauty may not be captured in words.* An hour on a reef at low tide, or a cruise in a boat equipped with a water glass, reveals a new world of loveliness. Or going below, with the diving helmet on, one discovers fresh beauties in familiar things.

Diving in deep water, outside the reefs, is perilous, since great sharks and giant groupers hunt there and are ugly customers. The grouper of this region, a mighty fish and apparently fearless, gives no warning of attack, but charges savagely. He is feared more than the sharks in our seas.

Eels are as plentiful as sea snakes in these tropical seas. Some grow to nearly eight feet in length, big fellows with formidable teeth and ever ready to fight. But the monster reef eel, 20 feet long, no naturalist has seen. Does it exist? Old roamers of the Barrier told W. Saville-Kent about it, and said they would rather face a man-eating shark any day than the giant reef eel.

---

*See, also, "First Autochromes from the Ocean Bottom," in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1927.

THE BEACH COMBER OF DUNK ISLAND

When "Confessions of a Beachcomber" was published in 1908 Romance smiled. Here was an authentic book, with all the charm of fiction. The author, a journalist, sick and world-weary, sought peace on an island off the coast of Queensland. Hope was a dying flame when he landed on Dunk Island. But he wakened, after a night of misgivings, to a new life instead of a hopeless dawn.

The self-styled "beach comber" and his wife lived for 25 years on their tropic isle. In his books, E. J. Banfield has told the story of a unique adventure in contentment, of life as it may be lived on a lonely isle, even in an age of airplanes and automobiles. My friend was a Nature lover and a scholar who could turn his hand to any needful task. His wife was a worthy comrade for the naturalist-recluse.

Their idyl ended tragically in 1923. Banfield died, and his widow, for several days, was alone in her grief. Then, waving a distress signal from the beach, she was seen from a passing steamer. Sailors went ashore—and a cairn on Dunk Island marks the grave of the man who loved wild Nature and the simple life, and marched to the music which he heard.

Dunk is the dream island, with its lovely beaches, its jungle-clad heights, its coral reef and its birds. The "beach comber" has written lovingly of the living things about him; of crabs and fishes and corals; of sunbirds that are jewels on the wing; of mound-making scrub fowls and the swiftlets that nest in a secret cave which few white men have visited. He took all Nature for his province, and on his island the gun was tabu: it was sanctuary for wild things large and small.

My days with the beach comber were golden, though on many rain fell drenchingly. He was rich in knowledge of the Great Barrier Reef, knew all the legends and true stories, and was friend with the

Photograph by Charles Barrett

A FOE OF THE FRUIT GROWER

"Flying foxes" is the popular title for fruit bats. They have become so great a pest in Queensland and New South Wales that Science is seeking a method of wholesale destruction. They form "camps" among fig and other trees; tens of thousands may resort to the same clump of trees.

Photograph by Charles Barrett

WHEN THE TIDE IS LOW

One may ramble for miles over the coral, around some islands of the Great Barrier system.

land and the sea. The bungalow, in its half-wild garden, was a tropical home where welcome seemed to smile from every corner.

Visitors dropped in from a lugger sheltering in the bay, from pleasure boats and from other craft. Invited, folk came from the mainland, not far away, or ended at Dunk Island journeys of a thousand miles. All sorts and conditions of men visited the isle, but none was more welcome than the naturalist, naming birds without a gun.

The romance of the Great Reef shines like a star in Banfield's books. He was not a scientist, but men of science learned from him secrets of the coral world. He made discoveries and gave them to his friends.

THE DYING RACE

Dunk Island was inhabited originally by blacks. There were tribes on the mainland, still in the Stone Age state, not so many years before Australia became a nation. Other isles of the Barrier Reef region were aboriginal territory. Progress has changed all that. Where the black man made fire by friction, sugar cane or cotton now grows; banana plants occupy hill slopes where cannibals camped, and the cassowary's haunts become narrower every year.

Still, there are aborigines in Queensland, untouched by civilization. They belong to the far-northern region and little-known western country. Primitive man has a place there; he has gone from the eastern isles.

The mainland, whose sea guardian is the Great Barrier Reef, lures to its forests and streams many who go north for coral islanding. It is a tropical wonderland, with rain forest rich in birds and splendid butterflies, in orchids and palms and ferns.

Crocodiles bask on the mud banks of north Queensland rivers and lurk among the mangroves by the sea. Nature has not yielded all her secrets yet, in this country of the cassowary and tree-climbing kangaroos. But the Great Barrier guards a hundred secrets, where the mainland has one. Is it not a wonder of the world?

YOUR CHOICE

Every soup you ever want, at its delicious best!

ASPARAGUS
BEAN
BEEF
BOUILLON
CELERY
CHICKEN
CHICKEN-GUMBO (OKRA)
CLAM CHOWDER
CONSOMMÉ
JULIENNE
MOCK TURTLE
MULLIGATAWNY
MUTTON
OX TAIL
PEA
PEPPER POT
PRINTANIER
TOMATO
VEGETABLE
VEGETABLE-BEEF
VERMICELLI-TOMATO

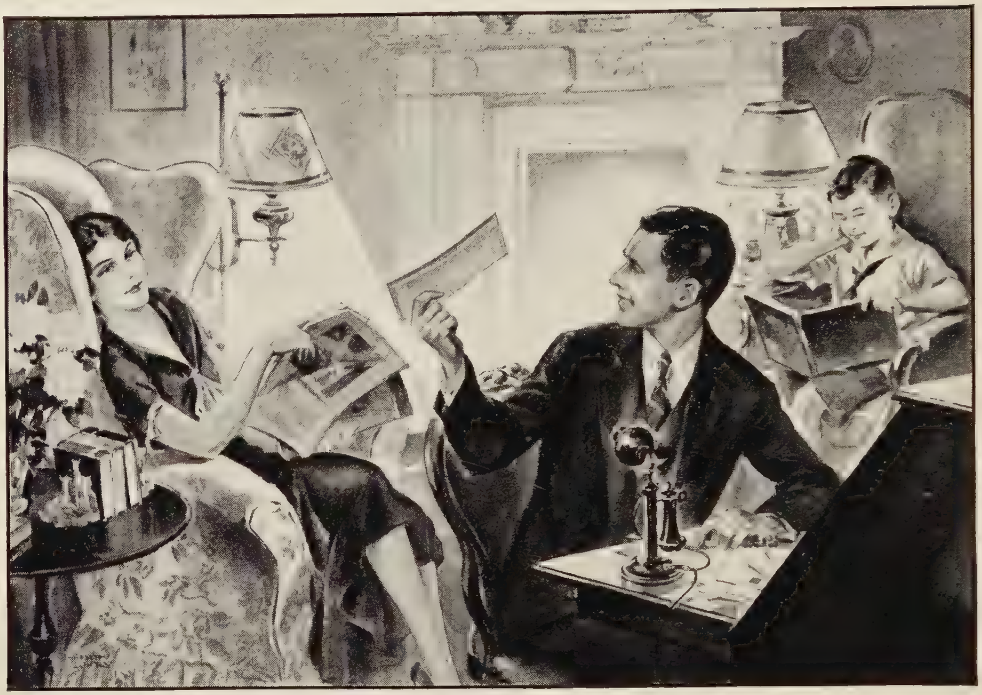
AN INTERNATIONAL FLAVOR!

A famous product of modern, progressive America. A union in the most complete sense of the high art and traditions of French cookery with those scrupulous American standards that are the marvel of the rest of the world. In Campbell's Tomato Soup your taste exults in a flavor which is truly cosmopolitan . . . racy, brilliant, exhilarating. And there are 20 other Campbell's Soups to fascinate you. 12 cents a can.

LOOK FOR THE
RED-AND-WHITE LABEL

Campbell's
CONDENSED
TOMATO SOUP
CAMPBELL SOUP COMPANY

MEAL-PLANNING IS EASIER WITH DAILY CHOICES FROM CAMPBELL'S 21 SOUPS



THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY PAYS ONLY A REGULAR, REASONABLE DIVIDEND TO THE 500,000 OWNERS OF ITS STOCK

They use it, they believe in it, they own it

An Advertisement of the American Telephone and Telegraph Company

THE Bell Telephone System is representative of the new type of ownership in American business, and of the responsibility to further the nation's welfare and prosperity which such an institution accepts.

Some 500,000 men and women, in nearly every town and city in the country, own the stock of the American Telephone and Telegraph Company. The average number of shares per stockholder is thirty. No single individual owns as much as one per cent of the total capital stock. The company pays only a regular, reasonable dividend, which it has not missed paying since its incorporation. Earnings beyond that go into the extension and improvement of the telephone service.

The Bell System is an American institution which consistently builds ahead of the communication needs of the day and year. Its construction program for 1930 requires the expenditure of approximately 700 million dollars.

The scope, speed and accuracy of its service is dependent on the constant research of more than 5000 scientific workers, new methods of operation and construction, and the co-ordinated efforts of more than 450,000 widely scattered employees. All its efforts are centered on giving the public a steadily improving telephone service at the lowest possible cost. This is the accepted responsibility of the Bell System.

The First Problem of Sound Investing

It is not "how *shall* I invest my surplus funds?" but "how *should* I?". Every investor must answer this primary question for himself. He alone has the knowledge which enables him to correctly appraise his personal financial situation and outlook. If he decides that investment securities provide the best answer to his problem, his next step is to call on an investment organization qualified to supply his particular needs.

The National City Company, with important investment contacts in all of the world markets, has the broadest possible opportunity for investigation, analysis and selection of securities. The distributing organization of the Company thus is able to submit to investors a wide range of securities singled out from the world's choicest offerings.

* * *

If you have surplus funds awaiting investment or wish to have your present holdings reviewed, you will find helpful assistance at any of our offices.

The National City Company

NATIONAL CITY BANK BUILDING, NEW YORK

INVESTMENT SECURITIES

Offices in Principal Cities throughout the United States and Canada and in London, Amsterdam, Geneva, Tokio and Shanghai.

Lilies of France inspired the design of this lovely glass

ALLURING is this new glass by Heisey, motived by the lilies that knights of France bore into battle for ladies fair. For autumn days, when entertaining goes into swifter rhythm, it will be delightful. Colorful, too, for you may have this glass in Flamingo rose, Moon Gleam green, Sahara gold or the orchid of rare Alexandrite. Crystal also if you like. Though charmingly voguish, this glass is moderately priced. *See it at leading department stores, gift shops or glassware stores. And write for your copy of valuable booklet.*

A. H. HEISEY & CO., Newark, Ohio.

Heisey's

GLASSWARE Ⓗ *for your table*

Glass Perfected Through the Secrets of 4,000 Years

In the days of King Louis the Ninth, whom they called Saint Louis, the glassworkers of France had reached such heights in their art that their creations were fashionable for the table. The French cherished the old, old secrets of glassmaking, many of which had come to them from the ancient Romans. The wonder of centuries-old secrets is reflected in fine, modern glass by Heisey.

Look for the Ⓗ on every piece

embossed on the glass or on adhesive label

Classic Masterpieces in Hardware by **RUSSWIN**

INTRODUCING in hardware a new interpretation of Old World architectural design — distinctly fitting for the exclusive suite, the restful foyer, the fine town house, country home or manor.

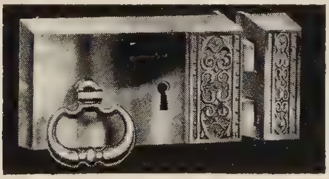
Massive in appearance with a rugged durability further enhanced by delicate arabesque traceries, RUSSWIN Rim-locks–like all RUSSWIN Hardware–are made of the finest metals, brass and bronze . . . every one of their component parts are hand-fitted by craftsmen, in order that their rare beauty and charm shall have a like perfection of workmanship.

The four designs shown herewith are the latest development of RUSSWIN, which for almost a century has been the pioneer of the "new" in hardware for the home.

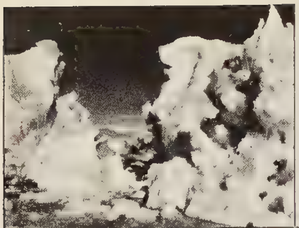
Inside and out, the quality of RUSSWIN Rim-locks is built to give years of lasting trouble-free service and satisfaction . . . hardware you will be proud to live with and which will be a fitting expression of good taste for all years to come.

Russell & Erwin Manufacturing Company (The American Hardware Corporation, Successor) New Britain, Connecticut—New York, Chicago, London.

R&E
SINCE 1839
RUSSWIN
RUSSELL & ERWIN
DISTINCTIVE
HARDWARE
Hardware that lasts — Base Metals of Bronze or Brass



For the Architect's convenience RUSSWIN Hardware is illustrated and described in Sweet's catalogue, pages C-3137—C-3216.



65° below in Little America—but Graflex Cameras got the pictures

Strange lighting—restless dogs—required Graflex direct focusing hood to eliminate all guess work

Graflex enabled Byrd, Gould and McKinley officially to picture the entire story of their thrilling adventures

Nine out of every ten of the several thousand official Byrd Expedition still pictures were taken with Graflex Cameras.

Graflex, the official still camera of the Expedition, justified its selection . . . even in the intense Antarctic cold not a single Graflex froze up.

The CAMERA for *Important* Pictures

GRAFLEX

FOLMER GRAFLEX CORP. . . . ROCHESTER, N.Y.

Folmer Graflex Corp., *Dept. 64*, Rochester, N.Y.

Please send to name and address on margin, "Why a Graflex" which tells how more interesting pictures are made with Graflex—the *official* still camera of the Byrd Antarctic Expedition.

THROUGH THE GREAT WALL OF CHINA----

No longer does the Great Wall forbid entrance to the golden beauty of the oldest of the Empires, now rapidly becoming democratic and progressive, and yet losing nothing of her immemorial loveliness. There is now the broad policy of the Open Door. The gates of hospitality are thrown open for visitors, to bring modern science and invention, and to experience all the age-old marvels. You will enter the gay cosmopolitan life of Shanghai, the far-flung grandeur of Peking.

How luxuriously and thrillingly you travel toward the East—

**JAPAN, CHINA AND THE PHILIPPINES
WITH STOP-OVER AT HONOLULU**

on the world-cruising fleet of the N. Y. K. Line with its equipment of magnificent suites, well-equipped gymnasiums, swimming pools, and exquisite meals, to suit every taste, with an American cuisine and served by English speaking stewards.

Regular sailings from San Francisco and Los Angeles, $300 up From Seattle and Victoria direct to the Orient, $195 up. *** Round-the-World in either direction with privilege of stop-over, $993 up, including rail fare. *** Around-the-Pacific Tours. Rates from $813.70 up

For detailed information, sailing schedules and descriptive literature, write Dept. 9

NIPPON YUSEN KAISHA

NEW YORK	10 Bridge Street—545-5th Avenue
CHICAGO	40 No. Dearborn Street
LOS ANGELES	605 So. Grand Avenue
SAN FRANCISCO	551 Market Street
SEATTLE	1404-4th Avenue

Our general agents or any local railroad or steamship agent

N·Y·K· LINE

Pepsodent

the special film-removing tooth paste

(*On the air with Amos 'n' Andy*)

Keeps teeth bright and gleaming. Protects against troubles that follow neglect.

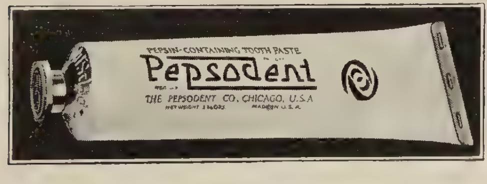
EVERY day you must remove from your teeth a cloudy film that coats them. Film is that slippery coating you can feel with your tongue. It sticks like glue and ordinary brushing fails to remove it effectively. Film absorbs the stains from food and smoking. It turns teeth dull, dingy.

Your dentist will tell you that when Pepsodent removes film from teeth it removes a great deal of the danger of decay and other troubles starting.

There is no pumice in Pepsodent, no harmful grit or crude abrasive. Hence it is safe for the teeth's delicate enamel.

Pepsodent imparts a polish and lustre to teeth that is decidedly unique. In the movies it is the chief means of gaining sparkling smiles.

Use Pepsodent twice a day. See your dentist twice a year.


PEPSIN-CONTAINING TOOTH PASTE
Pepsodent
THE PEPSODENT CO. CHICAGO, U.S.A.

Film is found by dental research to play an important part in tooth decay...to cause unsightly discolorations on enamel. It *must* be removed twice daily.

Free

To Every Woman *this* VALUABLE ··BOOK··

How to drape your windows

How to Drape Your Windows

Send today for your free copy of this amazing $1.00 value book. 80 pages of interesting facts and beautiful illustrations answer every question regarding window draping and color harmony. With it as a guide, you can easily and economically plan the most simple or intricate decorative schemes—make your home the envy of every visitor. Simply send us your name and address and a copy will be mailed to you.

And when you receive the book—ask the nearest Kirsch Dealer to show you the world's finest line of drapery hardware.

Kirsch

DRAPERY HARDWARE

KIRSCH COMPANY
575 Prospect Ave., Sturgis, Michigan, U. S. A.
You may send me free the new book by Kirsch, "How to Drape Your Windows."

Name..

Address..

City..............................State..............

THE LUXURY CRUISE

MEDITERRANEAN

PALESTINE
EGYPT

Greatest Program in History of this famous Cruising Steamer

ROTTERDAM

Leaves New York

FEB 5, 1931

71 days of delight

under Holland-America Line's own management

AMERICAN EXPRESS CO. in charge of shore excursions

The Rotterdam was recently entirely modernized. You will find her a model of modern comfort. Swimming pool, gymnasium and many spacious public salons. Excellently ventilated and spotlessly clean. Service and cuisine are the last word in perfection. Enjoyable and jolly entertainment.

For choice accommodations make reservations now.
Rates from $955

Write for illustrated Booklet "N"

HOLLAND-AMERICA LINE

21-24 State Street, New York
Branch Offices and Agents in all principal Cities

Mediterranean

HE ONLY CRUISE TO INCLUDE

ARNAK · LUXOR · THEBES

HE TOMBS WITHOUT EXTRA COST

Visiting many unusual and romantic places—Morocco, Balearic Isles, Dalmatian Coast, Rhodes in addition to the usual ports. Sixty-seven superbly planned days . . . the most comprehensive cycle of the world's glittering playgrounds at the height of their season. Cunard's finest first class service and cuisine. Guests limited to 390—half capacity.

WEST INDIES CHRISTMAS CRUISE—
16 days—Leaving New York December 20
—the NEW French Liner Lafayette.

1931
Mediterranean
Cruise
Frank Tourist Co

FRANK'S

NINTH ANNUAL CRUISE DE LUXE
EGYPT · HOLY LAND · EXCLUSIVELY
CHARTERED CUNARD S. S. SCYTHIA
JAN. 27, 1931

RANK TOURIST CO. EST. 1875

New York City
42 Fifth Avenue 480 Park Avenue
Philadelphia—1529 Locust Street
Chicago—175 No. Michigan Avenue

N.G.—9-30

Frank Tourist Co., 542 Fifth Ave., New York City
Please send me your free Mediterranean book

Name..

Address..

PENINSULAR *and* ORIENTAL

and

BRITISH INDIA STEAM NAVIGATION COMPANIES

The recognized way to India . . . Australia and the Far East.

Regular frequent sailings from London and Marseilles, by large, modern, superbly equipped liners.

Through bookings to Egypt, Sudan, India, Persian Gulf, Burma, Ceylon, Straits Settlements, China, Japan, East and South Africa, Mauritius, Australasia, etc. . . .

Round the World Tours.

Write for illustrated catalogue covering services and fares to Tour Department

CUNARD STEAM SHIP CO.
GENERAL AGENTS
25 Broadway, New York

JOHN HANCOCK SERIES

A PROBLEM *for* HOME MAKERS

Is the management of the Family Income.

OUR HOME BUDGET SHEET is designed to cover one month's record of income and outgo.

It is an Account Sheet for both the Beginner and the Budget-wise.

Sent FREE on request.

Inquiry Bureau

John Hancock
MUTUAL
LIFE INSURANCE COMPANY
OF BOSTON, MASSACHUSETTS
197 Clarendon Street, Boston, Mass.

Please send me FREE copy of the John Hancock Home Budget Sheet. (I enclose 2c. to cover postage.)

Name ....

Address ....

....

N.G.

OVER SIXTY-SEVEN YEARS IN BUSINESS

FRANCONIA 1931
WORLD CRUISE

The challenge of faraway places

In everyone's heart rings their insistent call . . . a vibrant urge to hunt out the world's far-lying glamorous places . . . to taste of real adventure . . .

The Franconia is an opportune answer to that challenge . . . to her credit are many famously successful world cruises . . . she will translate your cherished desires into glorious reality . . . within an atmosphere of gracious luxury . . . of yacht-like leisure.

Set forth with her to these longed-for faraway places . . . including outposts never touched by any cruising steamer . . . Madras . . . Belawan Deli, the gateway to jungled Batak villages . . . Kudat, in the throes of "Boat Day" excitement. Bali, without change of ship or extra cost. Samarang . . . Saigon . . . Bangkok.

The Franconia sails on January 10 . . . 138 days of wonderful ever-varied adventure . . . and back of it all the 179 years' combined experience and high standards of two world-famous leaders of travel.

THE FRANCONIA SAILS EASTWARD FROM NEW YORK JAN. 10, RETURNS MAY 28

Also Westward Around the World in the Samaria Sailing from New York Dec. 3

Literature and full information from your local agent or

CUNARD LINE
THOS. COOK & SON

A Garden Full of Darwin Tulips for $2.00

Few spring flowering plants rival the Darwin Tulip for brilliance of bloom. Borne on strong stems often exceeding three feet. They are a wonderful addition to the flower garden.

For **Two Dollars** we will send **50 Bulbs, Finest Mixed,** selected from fifteen named varieties.

Plant any time before the ground becomes frozen, and they will bloom from the middle of May to Decoration Day

Mail your order with Check, Money Order, Cash, or Stamps, mentioning this advertisement, and secure this exceptional collection, sent prepaid to your home anywhere in the United States.

Our 1930 Fall Bulb Catalogue sent on request

Stumpp & Walter Co

30-32 Barclay Street - - - New York

Branch Stores in

Newark, N. J.; White Plains, N. Y.; Stamford, Conn.; Hempstead, L. I.

APPROACHING . . .

The Ultimate in Radio

The **NEW ADMIRALTY SUPER-10** produced by NORDEN-HAUCK Engineers is the "Receiver Par Excellence." Distinguished for its Tone — Beauty — Long Range — Power — Selectivity — it is in fact "The Highest Class Receiver in the World."

Six Screen Grid Tubes and two 250 Super Power Tubes are used in the twelve - tube combination. Short Wave as well as Broadcast reception.

The **NEW ADMIRALTY SUPER - 10** possesses in an excelling degree the most modern advanced features in Radio Receiver design—Pre-selector tuning—grouped illuminated controls—double Push Pull audio amplification—tone shading—automatic Volume control—noise filter—tuning meter and electric clock concert Dynamic loudspeaker, etc.

A Booklet gives complete description of this radio's most unusual specifications and contains numerous illustrations of the Receiver and the luxurious custom built cabinets.

Write, telegraph or cable today!

NORDEN-HAUCK, Inc.

Engineers

Builders of the highest class
Radio Apparatus in the World

DELAWARE AVE. and SOUTH ST.
PHILADELPHIA, PA.

Scenic Cruises from New York to

CALIFORNIA

$350up ROUND TRIP ONE WAY WATER ONE WAY RAIL

You will visit South and Central America, Mexico and spend 2½ days at the Panama Canal — 10 fascinating foreign ports in all. From your home town at main line points and back in either direction. Meals and bed, first class, on steamer included. Return by any direct rail route, stop-over privileges at Apache Trail, Yellowstone, Grand Canyon, Yosemite, etc. Slight additional cost via Portland, Seattle, Vancouver or Canadian Rockies. *Sailings every two weeks from New York. $250 up, one way by water.*

Send for illustrated booklet "N"

GRACE - PANAMA MAIL LINE

10 Hanover Square, New York

MAPS

NEW EUROPE (1929). 34x39 inches. In 6 colors. Complete. Highly legible. With separate index of 10,000 place names, including old and new local official name and English equivalent; paper, $1.50; map linen, $2.00. Map alone, paper, $1.00; map linen, $1.50.

The UNITED STATES. This map, pronounced by experts the most complete yet issued, gives all places of 5,000 inhabitants or more, railroads, steamboat routes, national parks and connecting highways. Insets show sixteen large cities. 36 x 27 inches, five colors; paper, $1.00; map linen, $1.50.

for home, office, school

FULL LIST OF MAPS ON REQUEST

Postpaid in U. S.; Abroad, 25 cents extra

NATIONAL GEOGRAPHIC SOCIETY
Washington, D. C

THIS MAGAZINE IS FROM OUR PRESSES

JUDD & DETWEILER, INC.

Master Printers

ECKINGTON PLACE AND FLORIDA AVENUE WASHINGTON, D. C.

Get The Best

The "Supreme Authority"

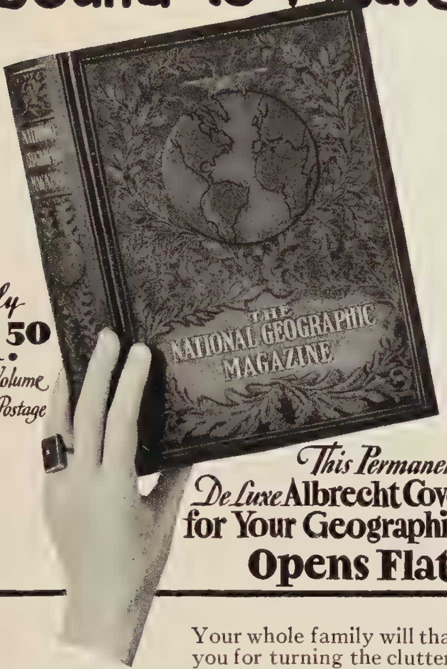
Universally accepted
and used in courts, colleges, schools,
business offices, and among government officials . . .

WEBSTER'S NEW INTERNATIONAL DICTIONARY

A Library in One Volume. In its 2,700 pages there are 452,000 entries, including 12,000 biographical entries, 32,000 geographical subjects, 100 valuable tables, over 6,000 illustrations. **Get The Best.** See it at any bookstore, or send for illustrated pamphlet containing sample pages . . . FREE, if you mention this magazine.

G. & C. MERRIAM COMPANY **Springfield, Mass.**

"Bound to Please"



Only
$1.50
Per Volume
Plus Postage

This Permanent *De Luxe* Albrecht Cover for Your Geographics Opens Flat

Your whole family will thank you for turning the clutter of loose magazines into beautiful and usable bound volumes. Send your Geographics to one of the 28 associated binders listed below. For only $1.50 per volume, plus postage, he will bind them with Albrecht Super-Covers—brown, richly embossed, 22kt. gold on backbone, oversewed, strongest material, durable, waterproof. They will be "Bound to Please."

Also, Loose-Leaf Covers

In same design for temporary binding of six current Geographics, only $1.50 each, plus postage.

Atlanta, Ga., Nat. Library Bndg. Co., 311-19 Spring St. N.W.
Austin, Tex., Thrift Book Binding Co., 413 Congress Ave.
Baltimore, Md., Joseph Ruzicka, 606 N. Eutaw St.
Boston, Mass., F. J. Barnard & Co., Inc., 368 Congress St.
Brooklyn, N. Y., Chivers Bookbinding Co., 33-47 Nassau Ave.
Chicago, Ill., Brabandt & Valters Bookbinding Co., 3827-29 E. Ravenswood Ave.
Denver, Colo., Dieter Bookbinding Co., 1130 23rd St.
Des Moines, Iowa, Hertzberg Bindery, Inc., East Grand Ave.
Detroit, Mich., Mack & Orth, 1036 Beaubein St.
E. Cleveland, O., Nat. Library Bndg. Co., 1766 E. 133rd St.
Greensboro, N. Car., Joseph Ruzicka Bindery, 224 S. Greene St.
Independence, Kans., William Wade, So. 10th and Country Club Drive
Indianapolis, Ind., Nat. Library Bndg. Co., 546 S. Meridian St.
Los Angeles, Pacific Library Bndg. Co., 770 E. Washington St.
Louisville, Ky., Kentucky Book Mfg. Co., 319 W. Liberty St.
Muskogee, Okla., Motter Bookbinding Co., 129 Times Place
New Orleans, La., Walter W. Eckert Co., 941 Lafayette St.
New York, N.Y., Dess & Talan Co., Inc., 213-221 E. 144th St.
Philadelphia, Pa., Nat. Library Bndg. Co., 224 N. 15th St.
Pittsburgh, Pa., Andrew G. Wirth, 302 Sandusky St., N. S.
Portland, Ore., Davis & Holman, 111 Second St.
St. Paul, Minn., Waldorf Bindery, 502 Prior Ave.
Salt Lake City, Utah, Utah Library Bindery, 363 6th East St.
San Francisco, Calif., Foster & Futernick Co., 444 Bryant St.
Spokane, Wash., V. J. Languille Co., 611 W. Third Ave.
W. Springfield, Mass., Nat. Library Bndg. Co., 271 Park St.
Falkirk, Scotland, Dunn & Wilson, Ltd., Bellevue Bindery
Canada, W. A. Bressey, The Bookshelf Bdy., Ridgetown, Ont.
Price, $1.85 in Canada

Covers Manufactured and Guaranteed by

THE ALBRECHT COMPANY
Baltimore, Md.
"Bound to Please"

The WORLD CRUISE "*with a* 5*th* ACE"

● It has (1) the distinguished Empress of Australia, 21,850 gross tons . . . (2) 137 days of spring . . . (3) this high-spot itinerary . . . (4) Paris-New York cuisine and service. It is built on Canadian Pacific's world-round system of rail, ship, hotel, and key-city offices . . . its "5th Ace". 8th season. From New York, Dec. 2. From $2000. Booklets, ship plans, your own agent, or any Canadian Pacific office: New York, Philadelphia, Boston, Chicago, Montreal and 30 other cities in the U. S. and Canada.

WORLD'S GREATEST
TRAVEL SYSTEM
Canadian Pacific

FLOATING UNIVERSITY

AROUND THE WORLD CRUISE

5th Annual voyage. Outstanding University faculty. University preparatory, undergraduate and graduate courses accepted for credit by leading universities. Most comprehensive itinerary. Superb Cunarder Samaria. Experienced management. Fare including tuition fee and single cabin $1850 up. Sailing December 3, 1930. Write for catalogue.

UNIVERSITY TRAVEL ASS'N, INC. 66 FIFTH AVE., NEW YORK

VIOLA ROOT CAMERON

Genealogist

(ESTABLISHED IN 1913)

FAMILY HISTORIES COMPILED AND PUBLISHED

COATS OF ARMS

CORRESPONDENCE INVITED

521 FIFTH AVENUE, NEW YORK

MAYFLOWER HOTEL
WASHINGTON, D. C.

57 CHANCERY LANE
LONDON

Go Back to School with all Washables Marked with ~

Cash's Names

Away from home CASH'S NAMES become doubly valuable. They identify clothing and owner as well. They save laundry losses, prevent arguments as to ownership and mark one's individuality. Neat, easy to apply, permanent, economical.

SPECIAL OFFER

Send 35c for Cash's "Family Set"—1 doz. each "Mother," "Father," "Sister," "Brother." Sew them on napkins, towels, etc., and avoid confusion.

12 Doz. $3.00
6 Doz. $2.00
9 Doz. $2.50
3 Doz. $1.50

JOSEPH LYONS

J.&J. Cash, Inc.

530th St., So. Norwalk, Conn., or
6409 So. Gramercy Place, Los Angeles, Cal.,
or 130 Gray St., Belleville, Ont.

Use Moore Push-less Hangers for Pictures

10c Packets Everywhere

They cling snugly to walls and insure safety for framed pictures, mirrors, etc. Four sizes. Easy to attach to walls For lightweight wall decorations, use Moore Push-Pins.

Moore Push-Pin Co., Philadelphia

DUES

Annual membership in U. S., $3.00; annual membership abroad, $4.00; Canada, $3.50; life membership, $100. Please make remittances payable to the National Geographic Society, and if at a distance remit by New York draft, postal or express order.

RECOMMENDATION FOR MEMBERSHIP

IN THE

NATIONAL GEOGRAPHIC SOCIETY

The Membership Fee, Which is for the Calendar Year, Includes Subscription to the National Geographic Magazine

PLEASE DETACH AND FILL IN BLANK BELOW AND SEND TO THE SECRETARY

---------------------------------193

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington, D. C.:

I nominate ---------------------------------

Occupation ---------------------------------
(This information is important for the records.)

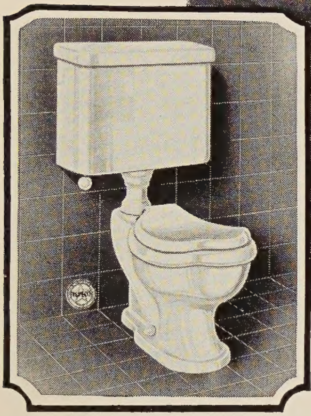
Address ---------------------------------

--------------------------------- *for membership in the Society.*

9-30

Name and Address of Nominating Member

The Improved QUIET SI-WEL-CLO



OUR GUARANTEE

We make but one grade of ware—the best that can be produced—and sell it at reasonable prices. We sell no seconds or culls. Our ware is guaranteed to be equal in quality and durability to any sanitary ware made in the world. The Te-pe-co trade mark is found on all goods manufactured by us and is your guarantee that you have received that for which you have paid.

Hygienic ▲▲ *Sanitary* ▲▲ *Quiet*

To the quiet operation of the Si-wel-clo Closet has been added a change in design which has brought favorable comment from medical authorities.

The decided dip in the rim elevates the front and rear of the bowl opening, minimizing the possibility of soiling.

The Improved Si-wel-clo is unquestionably the greatest advance in water closet construction of recent years. It is the most comfortable, hygienic, sanitary, clean and quiet closet that has ever been devised.

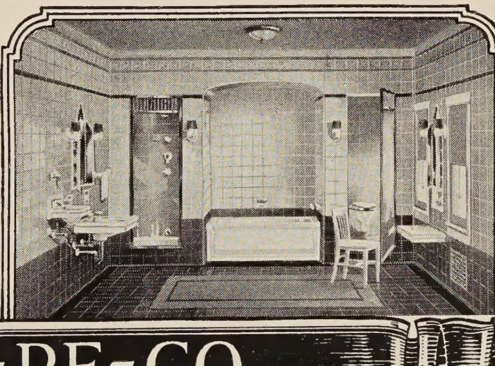
The Si-wel-clo is but one item of Te-pe-co All-Clay Bathroom Fixtures. Equip your entire bathroom with this glistening white, solid and substantial china and porcelain. A wise investment—a beautiful one.

Bathrooms of Character

By all means send 10 cents for the new edition of our plan book No. V-4. "Bathrooms of Character"

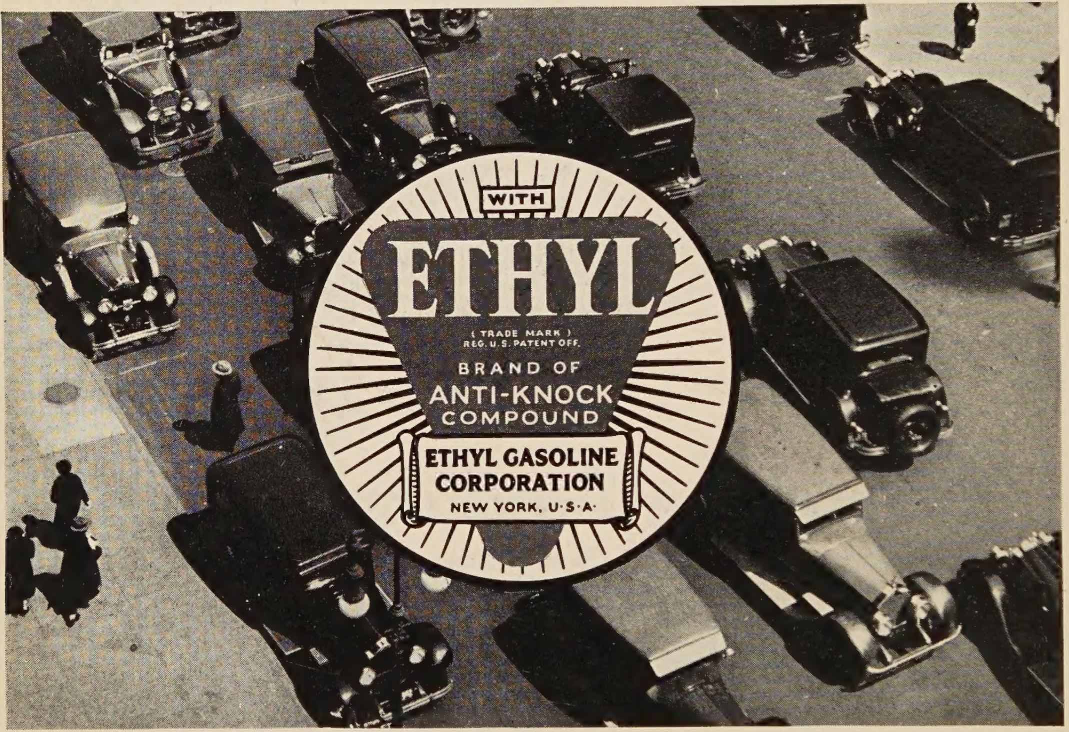
THE TRENTON POTTERIES CO.
Trenton, New Jersey, U. S. A.

National Exhibit Rooms
101 Park Ave., New York City, Entrance on 41st Street
Sales Offices in Philadelphia, Boston and San Francisco
Export Office: 115 Broad Street, New York City



TE-PE-CO
ALL-CLAY PLUMBING FIXTURES

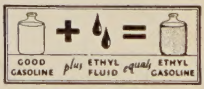
More people (*shrewd ones, too*) buying Ethyl *than any other gasoline*


WITH
ETHYL
(TRADE MARK) REG. U.S. PATENT OFF.
BRAND OF
ANTI-KNOCK
COMPOUND
ETHYL GASOLINE
CORPORATION
NEW YORK, U·S·A·

ETHYL Gasoline has become the biggest-selling motor fuel in America. Checks made on representative highways throughout the country show that about one pump in five now bears the Ethyl emblem. Stop at *any* of them. All Ethyl Gasoline is good.

Each of the 75 oil refining companies now mixing and selling Ethyl Gasoline has agreed to maintain fixed standards. The base gasoline must meet Ethyl standards of quality and volatility; then to this, enough Ethyl fluid is added to bring the mixture up to the requirements for Ethyl Gasoline.

Whatever car you drive, you will find Ethyl Gasoline improves performance. It gives greater power, quicker pick-up, and smoother, more efficient motor performance.


+
=
GOOD GASOLINE
plus
ETHYL FLUID
equals
ETHYL GASOLINE

Knocks out that "knock"

Any car runs better on Ethyl.

Ethyl Gasoline Corporation, Chrysler Building, New York City.

The active ingredient used in Ethyl fluid is lead.

©E. G. C. 1930

ETHYL GASOLINE

Surprisingly increased efficiency in the Two New Hoovers

Your Hoover dealer will be glad to show you these two remarkable new Hoover models, offering greatly increased dirt-removing ability and selling at the same price as former models.

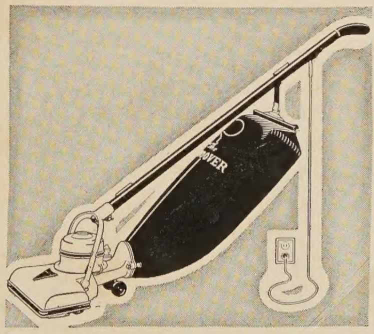
What if you polished your nails but did not clean beneath them?

YOU wouldn't think of having such a standard of cleanliness for your hands! But, quite unrealizing, you may have just such a standard for your floor coverings.

When you clean by broom or suction, you are leaving untouched the dirt beneath the surface. Nothing will get out this dirt except beating. There is only one effective way to beat it out—with a Hoover, whose exclusive cleaning principle, Positive Agitation, is especially designed for shaking out the destructive embedded grit.

So effectively does The Hoover remove this *underneath* dirt that it gets out more *dirt per minute* than any other cleaner, giving more thorough cleanliness in less time and with less expenditure of human energy.

It also gathers up the ugly thread and lint, brightens the rug colors and lifts and smooths the nap, thus giving new beauty to floor coverings by its scientific care. Ask our Hoover dealer for a free trial or home demonstration of The Hoover and its efficient dusting tools. Two Hoover models, only $6.25 down; balance monthly. Liberal allowance for your old cleaner.



HOOVER

IT BEATS..AS IT SWEEPS..AS IT CLEANS
ON A CUSHION OF AIR

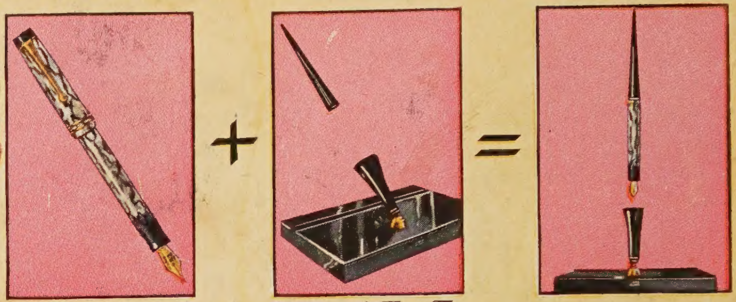
MORE DIRT
DPM
PER MINUTE

THE HOOVER COMPANY
North Canton, Ohio
The oldest and largest maker of electric cleaners
The Hoover is also made in Canada, at Hamilton, Ontario

© 1930, The Hoover Co.

PRESS OF JUDD & DETWEILER, INC.
WASHINGTON, D. C.

The First Lesson for the Fall Term of School



Pocket Duofold plus base and Free Taper
Equals Complete Desk Set
for Home Study

1–Parker Pocket Duofold being convertible—
2–saves the Price of a Desk Pen—
3–which Pays for the Desk Base!

Every Parker Duofold is convertible—a combination pocket and desk Pen both, at no extra charge.

Choose Parker Duofold and you virtually get two pens for the price of one.

Yet you have only one to fill. And you have your accustomed point *wherever* you are.

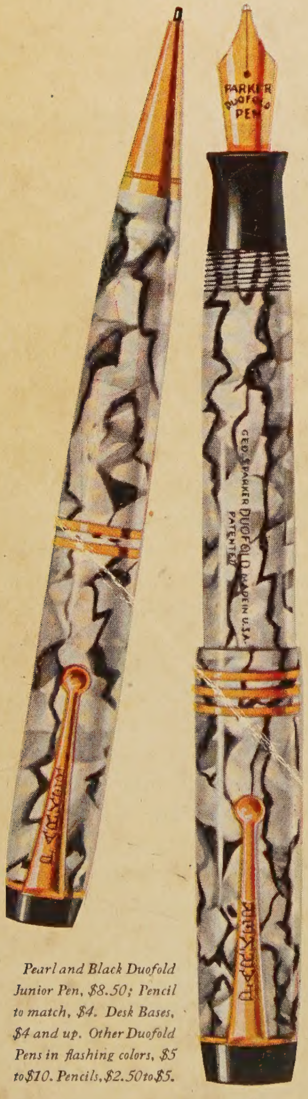
When you're on the go, it wears its trim, streamlined cap, with Parker's patented clip that holds the Pen low and unexposed in your pocket.

On your desk, it rests in Parker's ball and socket base. And with it comes the tapered end for the pen (once $1 extra), now included free.

Attaching the taper converts the Duofold into a Desk Set Pen. Removing it restores the Pen to a pocket model. Changing back and forth doesn't take ten seconds. *And taking your pen from your desk when you go insures your having it when you return.*

Paying more won't get you a thing—but will deprive you of this double value. For only the Parker offers this. And this in a Pen that holds 17.4% more ink than average, size for size, and is *Guaranteed for Life!*

The Parker Pen Company, Janesville, Wisconsin


PARKER
DUOFOLD
PEN
GEO. S. PARKER DUOFOLD PAT. IN U.S.A.
PATENTED

Pearl and Black Duofold Junior Pen, $8.50; Pencil to match, $4. Desk Bases, $4 and up. Other Duofold Pens in flashing colors, $5 to $10. Pencils, $2.50 to $5.

Parker PEN GUARANTEED FOR LIFE Duofold